

International Abstract of Surgery

SUPPLEMENTARY TO

Surgery, Gynecology and Obstetrics

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LOUIS E. SCHMIDT, M D, Genito Urinary Surgery	

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INTERNATIONAL ABSTRACT OF SURGERY

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COLLECTIVE REVIEW

ENDOCRINOLOGY IN RELATION TO OBSTETRICS AND GYNECOLOGY A REVIEW OF THE LITERATURE OF 1934

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THE literature on endocrinology in relation to obstetrics and gynecology for 1934 consisted chiefly of reports of physiological studies on experimental animals. The interrelationship between the ovaries, hypophysis, thyroid, and other endocrine glands was further investigated. Then there followed the study of the respective hormonal secretions of the glands. The next investigations were chemical and pharmacological studies of these hormones which hold greatest promise for the solution of endocrine problems.

On the basis of these fundamental studies further investigations of the Aschheim-Zondek test and its various modifications were reported. Physiological and anatomical pathology were studied from the endocrine viewpoint. The application of these physiological findings in animals to human physiology and pathology suggested therapeutic attempts. The hope and expectation of favorable results too often led to misinterpretation of the results of therapy. Again it is seen that experimental findings in animals cannot be translated in their entirety to human physiology by "inferential analogy" (Pratt).

General observations regarding the hormones were discussed by Venzmer in describing the apparent hormonal variations in different races. Venzmer correlated physical, physiological, and biological differences in the races with their hormonal variations. In the negro race, for instance, he found larger adrenals, which explain the pigmentation of negroes.

L. Girard considered the question of a single human hormone, a fat soluble as well as a water-

soluble hormone. He called vitamins "exogenous, alimentary hormones." These are partly chemically related to the endogenous hormones, Vitamin C, for instance, being related to adrenalin and Vitamin A to the female sex hormone.

Ueno described an atrophic regressive degeneration in the ovary, pituitary, and thyroid glands of white rats resulting from Vitamin-B deficiency.

Wislanski concluded from his experiments with epiphysis (pineal) extracts that the epiphysis and hypophysis are the two endocrine glands which may induce premature development of the female genitalia.

E. Novak (1, 2, 7), Claiborn (1), and Westman (1) emphasized the brilliant endocrinological advances in the field of reproductive physiology and their application to many gynecological problems exclusive of organotherapy.

Dohrn also reviewed the findings of work done with hormones, principally the effect of the pituitary secretion on the genitalia. E. Novak (2) described the action of the hypophysis with its Prolan A action producing follicle development and its Prolan-B action producing corpus-luteum development. The thyroid and other endocrines may influence this physiological chain of activity. With this concept, Novak explained various physiological disturbances such as amenorrhea, dysmenorrhea, menorrhagia, metrorrhagia, and sterility by disturbed activity of the links in the chain.

Marshall also reviewed present-day views and mentioned the gonadotropic hormone therapy for

various functional disorders such as dysmenorrhea and habitual abortion. In considering the constitution of women and the endocrine glands, Maczewski and Pende advocated dividing women into clinical types. They felt that in classifying a woman they would consider her as of a pyknic, athletic, asthenic, intersexual, or infantile type on the basis of these considerations.

In the attempt to present the material reviewed in a logical form it was divided into physiology, chemistry, pathology, and therapy. There was, as expected, much overlapping. In the discussion of physiology and biology the basic glands and their hormones will be considered.

HYPOPHYSIS

The gonadotropic hormone according to Allan, is secreted during the greater part of the life cycle. It is found in comparatively large amounts in the urine of newborn infants and of children under the age of puberty, having been noted in about half the cases investigated. During the menstrual cycle and mainly during its second half, only Prolan A is excreted. The gonadotropic hormone reaches the maximum early in pregnancy, when both Prolan A and Prolan B are present, and then gradually falls. Following delivery, the hormone rapidly falls to normal levels. In the latter part of the menopause there is a marked increase in the excretion of Prolan A, which may persist for many years. The same changes follow operative and X-ray sterilization.

Mazer's discussion of the histology and physiology of the hypophysis and its control of the structure and function of the ovaries is very lucid and follows the views generally accepted today. The derangements of the hypophysis in relation to menstruation will be considered later.

Levy Solal, Walther, and Dalsace found that the placenta does not allow passage of the gonadotropic hormone through it.

Schockaert and Sieble, using ground hypophysis of the adult human female found in the anterior lobe up to 4,000 m. u. of Hormone A and up to 1,500 m. u. of Hormone B. Therefore, 1 gm. of this organ may contain from 8,000 to 10,000 m. u. of Hormone A and about 3,500 m. u. of Hormone B. Their findings indicated also that glandular products have a higher gonadotropic hormone content than pregnancy urine.

The influence of a gonadotropic preparation (total dose from 200 to 400 m. u.) of the anterior lobe of the hypophysis on the internal genitalia of 3 women was described by Stoeckl (2).

Certok and Penkov found only a slight influence exerted on the menopausal genitalia by

the injection of pregnancy urine. Although it has been shown that subcutaneous injections of an extract of the anterior pituitary can produce a marked follicular response in the ovaries, Johnson was unable to induce luteinization of the follicles of the ovaries of macacus rhesus monkeys with large doses of Antuitrin S (anterior pituitary like substances).

Valerio established the fact that, for Prolan B to be effective, Prolan A must mature the follicle and sensitize the ovarian follicle for the luteinizing influence of Prolan B. A similar investigation carried out by Brindeau, H. Hinglais, and M. Hinglais (4) confirmed these findings and those of Aschheim.

Wallen Lawrence presented evidence of a Prolan A and Prolan B component in the anterior lobe of the pituitary gland. The preparation was more effective in an alkaline than in an acid solution. The powder form loses the luteinizing hormone. In rats and rabbits, Casida observed ovulation which he thought was definitely related to Factors A and B of the gonadotropic extracts. Westman, Jorpes, and Linde were unable to separate Factor A from Factor B with either acid or alkali.

Mazer and Katz presented evidence that prol-an and anterior pituitary sex hormone are not identical. Leonard and Smith concluded that the urine of climacteric women contains a true anterior pituitary hormone because the action of this urinary extract was the same as that of the gonadotropic hormone of the anterior hypophysis.

Evans, Pencharz, and Simpson found that prol-an combined with the hypophyseal synergist (hypophyseal extract) was just as effective in stimulating the growth of the ovaries of hypophysectomized rats as the growth of the ovaries of normal immature rats although the ovaries of the hypophysectomized animals remained atrophic after the administration of prol-an alone. In intensifying the effect of prol-an on the sexual system the synergist therefore resembles a substance supplied *in vivo* by the hypophysis of normal rats. Anselmino and Hoffmann (3) concluded that the gonadotropic hormone found in the urine of castrated or climacteric women is not prol-an but the so-called "synergistic factor."

As determined by Fluhmann (4) the ovary stimulating hormones may be divided into 2 categories. The first group may be considered the "pituitary hormone" which includes the extracts prepared from anterior lobe material as well as the substance obtained from the blood or urine of women after castration or after menopause. The second group the "chorionic hor-

none," is made up of material obtained from the blood or urine of women during gestation or associated with hydatidiform mole or chorionepithelioma.

Fevold and Hisaw described an improved method for separation of the follicle-stimulating and the luteinizing hormones of the anterior lobe of the hypophysis.

In quantitative determinations of hormones in the urine of castrated women Damm (2) found that Prolan A was present about two weeks after castration while estrin was absent.

In rats, castration leads to an increase in the relative number and size of the basophilic elements of the anterior hypophysis, which become modified and give rise to the so called castration cells. However, with regard to the changes in the eosinophiles there is no consensus of opinion. Therefore Ellison and Wolfe studied the effects of castration in both male and female rats at definite intervals after the castration.

Stein reported that from the standpoint of number, size, shape, nuclear pattern, staining reaction, and distribution of cells in the gland, he was unable to find any definite or unique histological feature in the hypophysis of pregnant white rats. Neither was he able to discover in the rat any special cell which resembled the "pregnancy cell" described by others.

Day discussed other methods for the preparation of the gonadotropic hormones from the urine of pregnant women. A method for separating anterior pituitary gonadotropic hormone from the sex hormone of the ovary was described by Gostimirovic.

Zondek and Euler stated that in the explosive-like elumination of prolactin at the beginning of pregnancy, the placenta, as a hormone producer, as well as hyperfunction of the hypophysis may be considered sources. On the basis of a strong Aschheim-Zondek reaction and negative roentgen findings, Reeb, Nerson, and Klein diagnosed hydatid mole in 2 pregnant women. In neither instance was the diagnosis correct, but the placenta showed marked cellular activity.

Baumann extracted from the urine of pregnant women a new substance which produced marked atrophy of the ciliated cells of the mucous membrane of the fallopian tube of a non-pregnant rat.

The germinative portions of the gonads of rabbits which had undergone degeneration as the result of ligation of the tubes were restored by Pighini by from 15 to 20 daily injections of 1 cc of anterior pituitary extract.

From onions, Peisachovic isolated a water soluble phytohormone which he called "luto-

estrogen." On the basis of its biological action, 1 kgm of fresh onion yielded 1,000 biological mouse or 20 rabbit units.

Szarka (3) described a combination of extracts from the anterior hypophysis, placenta, and blood of a pregnant woman which is called "lutocrescin." This substance is not toxic and contains no growth or follicle hormone. In immature rats it produces follicle development, blood points, and luteinization. With an increase in the dose and the length of time the substance is used, the size of the ovaries is increased.

Consoli (2) found the prolactin content of perspiration from pregnant women to be slight and confirmed the work of Garofalo.

Geyer (1) determined experimentally that the anterior hypophysis of pregnant and non-pregnant women possesses an adrenaltropic hormone which is not present in the placenta, the urine of pregnant animals, or the trophoblast.

The determination of the sex of the unborn as described by Dorn and Sugarman was not substantiated by Murphy and De Renyi although it was confirmed by Gerhardt and Popielski.

Orru studied the changes in the reticulo-endothelial system of the uterus and ovary after the administration of prolactin and pregnancy urine. He found a marked and active proliferation of the reticulo-endothelial elements, but it was less intense than that which has been demonstrated during gestation.

Tachezy repeated Knaus' investigations on the action of pituitrin on the uterus. Using the intra-uterine condom method, he found that pituitrin could not induce uterine contractions in the latter half of the menstrual cycle when the inhibition of the corpus luteum was dominant. He stated also that he found it impossible to determine the end of ovulation with the certainty of Knaus.

A study of the effect of posterior pituitary extract on the ovaries of guinea pigs was carried out by Zocchi (2). Regardless of the size of the dose of the extract, the effect was degeneration of the primordial ovum and its granulosa and, in the larger follicles, cystic changes with degeneration of the follicle epithelium. Ten days after the last injection the ovaries appeared to have recovered from the harmful effect of the extract.

Bergman found that removing the hypophysis in pregnant rats brought about death and expulsion of the fetus although corpora lutea were present.

OVARY

A review of the work on the hormones of the ovary was presented by Pinckney and by Jayle

various functional disorders such as dysmenorrhea and habitual abortion. In considering the constitution of women and the endocrine glands, Maczewski and Pende advocated dividing women into clinical types. They felt that in classifying a woman they would consider her as of a pyknic, athletic, asthenic, intersexual, or infantile type on the basis of these considerations.

In the attempt to present the material reviewed in a logical form it was divided into physiology, chemistry, pathology, and therapy. There was, as expected, much overlapping. In the discussion of physiology and biology the basic glands and their hormones will be considered.

HYPOPHYSIS

The gonadotropic hormone, according to Allan, is secreted during the greater part of the life cycle. It is found in comparatively large amounts in the urine of newborn infants and of children under the age of puberty having been noted in about half the cases investigated. During the menstrual cycle and mainly during its second half, only Prolan A is excreted. The gonadotropic hormone reaches the maximum early in pregnancy, when both Prolan A and Prolan B are present, and then gradually falls. Following delivery, the hormone rapidly falls to normal levels. In the latter part of the menopause there is a marked increase in the excretion of Prolan A, which may persist for many years. The same changes follow operative and X-ray sterilization.

Mazer's discussion of the histology and physiology of the hypophysis and its control of the structure and function of the ovaries is very lucid and follows the views generally accepted today. The derangements of the hypophysis in relation to menstruation will be considered later.

Levy Solal Walther and Dalsace found that the placenta does not allow passage of the gonadotropic hormone through it.

Schockaert and Siebke using ground hypophysis of the adult human female, found in the anterior lobe up to 4,000 m u of Hormone A and up to 1,500 m u of Hormone B. Therefore, 1 gm of this organ may contain from 8,000 to 10,000 m u of Hormone A and about 3,500 m u of Hormone B. Their findings indicated also that glandular products have a higher gonadotropic hormone content than pregnancy urine.

The influence of a gonadotropic preparation (total dose from 200 to 400 m u) of the anterior lobe of the hypophysis on the internal genitalia of 3 women was described by Stoekl (2).

Certok and Penkov found only a slight influence exerted on the menopausal genitalia by

the injection of pregnancy urine. Although it has been shown that subcutaneous injections of an extract of the anterior pituitary can produce a marked follicular response in the ovaries, Johnson was unable to induce luteinization of the follicles of the ovaries of macacus rhesus monkeys with large doses of Antuitrin S (anterior pituitary like substances).

Valerio established the fact that, for Prolan B to be effective, Prolan A must mature the follicle and sensitize the ovarian follicle for the luteinizing influence of Prolan B. A similar investigation carried out by Brindeau, H. Hinglais, and M. Hinglais (4) confirmed these findings and those of Aschheim.

Wallen Lawrence presented evidence of a Prolan A and Prolan B component in the anterior lobe of the pituitary gland. The preparation was more effective in an alkaline than in an acid solution. The powder form loses the luteinizing hormone. In rats and rabbits, Casida observed ovulation which he thought was definitely related to Factors A and B of the gonadotropic extracts. Westman, Jorpes, and Linde were unable to separate Factor A from Factor B with either acid or alkali.

Mazer and Katz presented evidence that prolactin and anterior pituitary sex hormone are not identical. Leonard and Smith concluded that the urine of climacteric women contains a true anterior pituitary hormone because the action of this urinary extract was the same as that of the gonadotropic hormone of the anterior hypophysis.

Evans, Pencharz and Simpson found that prolactin combined with the hypophyseal synergist (hypophyseal extract) was just as effective in stimulating the growth of the ovaries of hypophysectomized rats as the growth of the ovaries of normal immature rats although the ovaries of the hypophysectomized animals remained atrophic after the administration of prolactin alone. In intensifying the effect of prolactin on the sexual system the synergist therefore resembles a substance supplied *in vivo* by the hypophysis of normal rats. Anselmino and Hoffmann (3) concluded that the gonadotropic hormone found in the urine of castrated or climacteric women is not prolactin but the so-called "synergistic factor."

As determined by Fluhmann (4) the ovary stimulating hormones may be divided into 2 categories. The first group may be considered the "pituitary hormone," which includes the extracts prepared from anterior lobe material as well as the substance obtained from the blood or urine of women after castration or after menopause. The second group, the "chorionic hor-

in the rabbit, retention of the fetus in the uterus is under hormonal control. The termination of its retention coincides with the termination of the life cycle of the corpus luteum.

Engle (2) found that the anterior-pituitary-like principle of human pregnancy urine not only fails to cause follicular activation, but definitely inhibits the production of estrin as judged from loss of color of the sex skin and estrin previa bleeding from the uterus.

Ovaries of infantile rabbits were unaffected by pituitary extracts while those of juvenile rabbits responded to the maximum degree. Hertz and Hisaw further demonstrated that the purified follicle-stimulating extract induced follicle formation followed by collapse without intermediary luteinization. The luteinizing extract produced corpora lutea, whereas successive injections of these hormones produced the normal sequence of ovulation and luteinization in fewer than half of the animals.

Siegmund (4) also observed the resistance of primordial follicles of mature as well as infantile ovaries to gonadotropic hormones.

By injecting extracts of adrenals from non-pregnant mares and geldings, Casida and Hellbaum induced ovarian responses, including ovulation, in 50 per cent of the responding test animals. Extracts of whole blood, blood serum, liver, and ovaries from these classes of horses failed to produce positive responses.

The ovaries of newborn rats transplanted into adult ovariectomized rats were found by Pfeiffer to maintain the cyclic changes in the genital system after from twelve to sixteen days.

Two women who had been in the menopause respectively for two and three years received transfusions of blood from pregnant women near term before being operated upon for carcinoma of the uterus. Westman (3) found a corpora hemorrhagica in one of the ovaries of one woman and a partially luteinized follicle in one of the ovaries of the other.

In cautioning against acceptance of evidence such as that presented by Westman, Waldeyer cited 7 cases in which the return of ovarian function occurred spontaneously after the menopause had been apparently established.

Rosenblatt and Nathan compared the changes observed in the ovaries during the various stages of pregnancy in the rabbit with those observed after the injection of pregnancy urine. Similar changes may be seen in human ovaries during an operation for tubal pregnancy.

In rabbits, Padoutcheva, Vunder, Rubinstein, and Zawadowsky were able to induce ovulation

with prolactin and then to fertilize the ovum by injecting semen into the vagina or the uterus.

With the advance of our knowledge of the physiology of the ovary, the effect of the activities of this gland on the whole organism will be investigated. In the human female, Holahut found an increase in the coagulation time with hypoplasia of the genitalia and ovaries. He thought that the phenomena were related to the uterine endometrium. In rabbits, Jalowy determined a similar phenomenon after ovariectomy, but it disappeared after twelve weeks.

Kuestner and Schulz were able to demonstrate a difference in the coagulation time of the blood of women with and without ovaries who were exposed to red light rays. An increase in the coagulation time after the exposure indicated normal ovaries while no change in the time indicated deficiency or underfunction.

Since the cholesterol blood level was unaffected by injections of anterior pituitary hormone unless the ovaries were present, Nizza (2) was of the opinion that this change was due to the indirect effect of the ovary (follicle hormone?) on the adrenal cortex. By extraction of the follicular fluid and the whole ovary with lipid solvents, Anselmino, Hoffmann, and Herold (2) obtained a substance related to the estrous hormone but not identical with it. This substance stimulated the activity of the thyroid, parathyroid, pancreas, and anterior pituitary. On the basis of experimental studies, Yuuki stated that not only carbohydrate assimilation but also the influence of cholic acid is related to the function of the ovary. Theiss was unable to find any relationship between creatin utilization and ovarian function. From his studies, Uebermuth drew the conclusion that the corpus luteum is a "protective potential of the reticulo-endothelial system." On the basis of chemical sympathectomy on the ovaries of rabbits, Matteace (3) concluded that the action of the hormones is humoral rather than nervous.

A unilateral oophorectomy on rabbits produced a decrease in the activity (weaker and less frequent contraction) of the adjacent tube as compared with the normal side. Martinoli and Censi were unable to find any histological or gross differences in the tubes. On the basis of their experiments they considered other etiological factors of ectopic pregnancy.

One year after hysterectomy, Siegmund (2) found that ovulation still occurred in the ovaries of rabbits. Matteace (2) hysterectomized mature and immature rabbits and injected pregnancy urine weekly (0.5 cc per kilogram of body weight). The ovaries of the controls became

progressively atrophic while in those of the treated rabbits no atrophy was observed

Tamis studied ovarian function after hysterectomy by means of estrin and Profan A determinations of the urine. Ovarian activity persisted longer in women under thirty five years of age at the time of operation than in older women. Tamis suggested that the gynecologist attempt to conserve not only the ovaries but also as much of the uterine mucosa as may be feasible when treating uterine fibroids.

In hysterectomized rabbits which were observed for a year Siegmund (2) found the uterus unnecessary for development of the follicle but necessary for the development of the corpus luteum. Dworzek and Podleschka (1) believed that their studies on autotransplantation of the uterus and ovary into the eves of rabbits indicated that the uterus develops a hormone. Cheval, utilizing dogs and transplanting pieces of uterine and ovarian tissue into the abdominal muscles, came to the same conclusion. Mayer (1), on the basis of dog experiments, suggested that in all cases in which bilateral oophorectomy is performed on a woman under fifty years of age a subcutaneous transplantation of the ovarian tissue should be done, and that when removal of the uterus is necessary a piece of the uterine fundus with endometrium should be transplanted. He concluded that there is an internal hormonal relationship between the uterus and ovary, that is, a "uterine hormone."

Banicki found that in white mice castration produced degeneration of the hypophysis. Ovarian hormone had an effect similar to that of the anterior pituitary hormone on the castration hypophysis.

Yun was able to protect guinea pigs against anaphylaxis by injections of follicular fluid.

The investigation by Seguy and Simonnet for signs of ovulation in women revealed a characteristic change in the cervical secretion, which became more liquid and transparent. At operation it was found that this change occurred at the time of rupture of the ripe follicle.

Vaccari tested the effect of the various ovarian and mammary extracts on the pregnant uterus of the guinea pig. He found that the follicle hormone produced increased amplitude and spasm of the contractions of the smooth muscle whereas the corpus luteum hormone extract had the opposite effect. He therefore suggested extract of corpus luteum hormone for the treatment of habitual abortion.

In transplanting ovarian tissue in guinea pigs Seemann observed that the transplants grew in

organs related to the urogenital system (such as the adrenals) rather than in muscle, liver, spleen, parotid gland, or any gland not related to that system.

Wallart described the rich nerve network of the paraganglion in the hilus of the ovary of the pig which was demonstrable by various staining procedures such as the method of Cajal as modified by Pines and Schapiro.

Stur (1) believed that he could overcome irregularities of the menstrual cycle by protein injections because the gonadotropic hormone and sexual hormone were combined with a protein when they acted while the corpus luteum hormone was combined with a lipid substance.

Spirito (1, 2) attempted to produce a biological reaction of pregnancy by transplanting ovarian tissue into the eye of female rabbits and injecting the urine of pregnant women into the animals following the transplantation. The results were all negative.

Sigler stated that the Frank Goldberger test for female sex hormone in the blood is of great value in the diagnosis of ovarian dysfunction. He based the results of the test on the identical changes occurring in the vaginal mucosa and the vaginal secretion of women and rats during the resting, premenstrual, menstrual, and post menstrual periods. He considered the test of more diagnostic value than the determination of estrin in the urine of patients.

Pighini reported experiments on female rabbits in which after ligating the uterine tubes, he injected an emulsion of anterior hypophyseal extracts. The extracts produced in the gonads early processes of reparation and functional reactivations.

The result of Cordaro's research (2) showed that it is possible to regulate the ovarian function by exposing it to the stimulus of the anterior pituitary hormone. These anterior pituitary extracts tend to accelerate ovulation, whereas, when the quantity of prolactin is increased, a hormonal castration may be produced.

De Silva Pinto stated that since the appearance of catamenia is followed by a marked diminution of the lacteal secretion indicating a functional correlation between the ovaries and the breasts, the lipoids of the corpus luteum possess lactogenic properties.

According to Fabiao, folliculin and lutein hormones have a selective action on the phases of the menstrual cycle in women, but fail to correct some metabolic endocrine and sympathetic disturbances associated with certain forms of ovarian insufficiency. The third ovarian hor-

none, described by Anselmino, has no action on the vaginal cycle of rodents but stimulates the thyroid, parathyroids, and pancreas

Proto observed the histological changes in the thyroid of mature dogs after oophorectomy. He found that the operation produced hyperplasia and hyperactivity of the gland.

Cramarossa (1) referred to a patient presenting exophthalmic goiter following panhysterectomy and bilateral salpingo-oophorectomy. He attributed the goiter to a sympathetic endocrine metabolic deficiency occasioned by the suppression of ovarian function and the absence of the uterus.

Estrin

Frank discussed the value of determinations of estrin in the blood in analyzing the various functional disturbances of the female sex cycle. According to the hormonal studies of Frank, Goldberger, and Spielman, underfunction of the ovaries produces oligomenorrhea, amenorrhea, sterility, and dysmenorrhea. In the absence of pathological causes, overfunction of the ovaries was evidenced by excessive, prolonged, or irregular bleeding. Exceptions to these findings are polychromic amenorrhea, in which the excretion is continuous and uninterrupted, and bleeding in cases of underfunction of the ovaries, which is associated with hypothyroidism.

According to King (1), the uterine reaction to estrin in immature guinea pigs may show great irregularity. Enormous and disproportionate uterine hypertrophy may appear as early as at the end of eighteen hours.

Frank's studies of the menopause showed a varied hormonal picture regardless of the subjective symptoms. An interesting case was one with a normal blood cycle seventeen years after hysterectomy. After the onset of the normal menopause, i.e., cessation of bleeding, the ovarian function may continue for months or years, to a diminished degree, just as in the amenorrheas, or may be abolished abruptly.

Robins presented a brief review on estrin and its relation to the anterior pituitary hormone, cautioning against haphazard hormonal therapy.

Fliuhmann (3) described a new biological test for the demonstration of estrin in the blood. It consists of 3 injections of 0.5 ccm of serum daily for three consecutive days into adult spayed female mice. On the fourth morning the animal is sacrificed. The vagina is then dissected out, fixed in formalin, and embedded in paraffin, and sections are stained with hematoxylin-eosin. A positive result is indicated by "mucification" of the vaginal mucosa.

Sauphar suggested a new clinical test to determine the activity of estrin by observing the effect of the injected material on the breasts.

Ehrhardt and Kuehn (2) reported further the value of the bitterling as a test animal for hormone since 3/50,000 m u per cubic centimeter of water induced a positive reaction. Their results indicated a relationship between the ovipositor-stimulating hormone and estrin.

Dodds (2) stated that the estrus producing hormones in the urine of pregnant women belong to the group of sterols and have in common a partially hydrogenated phenanthrene ring. He discussed the chemistry of the hormones and their practical application in the amenorrheas as demonstrated by the work of Kaufmann.

Rivore (1) reviewed the history, physiological, chemical physical properties, clinical indications, and dosage of estrin as described by the various investigators already cited or to be cited.

Zondek (11) was able to recover only 1 per cent of folliculin after injecting large amounts (40,000 m u) into infantile rats.

Sieble found 10,000 m u of estrin hormone in the benzol extract of the urine and feces of a normal woman during a normal menstrual cycle.

Robson, MacGregor, Illingworth, and Steere studied the excretion of estrin after its injection in known doses into women who had passed the menopause or had been subjected to bilateral oophorectomy. They found that only a small proportion of the estrin administered could be recovered from the urine. Therefore the human body rapidly destroys the estrous hormone or renders it inactive. It was found that substantial amounts of estrin may be excreted in the urine even eighteen years after the menopause.

An increase in the estrin content of the blood was present with the increase of vaginal fluor of the non infectious type. Cruickshank and Sharman correlated these findings with the chemical, bacteriological, and histological studies of the biology of the vagina. Therefore they attributed many of these non infectious fluors to hormonal disturbances between the anterior pituitary gland and the ovary.

According to Moricard, folliculin is secreted from the theca interna cells which are in intimate relationship with the circulatory system whereas the stratum granulosum is avascular.

Parkes has observed that although the follicular apparatus may be destroyed by radiotherapy, keratinization of the vagina continues after such treatment.

Stoermer and Westphal described the physiological effect of estrin and the test methods. In

reporting their chemical studies they described the derivatives and the synthesis of folliculin.

Schoeller and Goebel observed that estrin definitely stimulated the growth of hyacinths.

Rosenthal showed that explanted vaginal epithelium did not react as well as the vaginal epithelium *in situ* indicating that the hormone may be acting through the nerves or through connective tissue.

Burrows and Kennaway induced estrus in female mice by applying estrin twice a week for six weeks on the non epilated skin (interscapular region). Later examination of the animals showed thickening and keratinization of the vaginal epithelium. This observation may be of significance since there is a similarity between the chemical structure of estrin and certain carcinogenic compounds.

Eight cases were presented by Frame to illustrate estrin reactions in husbands of pregnant women.

The known physiological rôles of the gonadal hormones (estrin and progesterin of the ovary) and the extragonadal hormones (Prolan A and Prolan B of the anterior pituitary) were described by Morany.

The effect of the prolonged administration of theelin and theelol on female rats was studied by Wade. Reproduction was below normal, and interference with lactation was observed.

Zondek and Euler determined that in the sexually mature the amount of estrin is between 5 and 30 m u per liter and is not influenced by diet. There are 3 sources of estrin: gonadal, extragonadal and placental.

By studies of the urine and feces of men Eng found that estrin is obtained in the nourishment taken by man.

Naïto obtained from 1 to 3 m u of estrin from the serum of the newborn and the mother. Anterior pituitary hormone was present in the mother's serum to the extent of 5 m u per cubic centimeter and in the child's serum to the extent of only 1 m u per cubic centimeter. From 1 gm of meconium, about 30 m u were obtained.

Brindeau, H. Hinglais, and M. Hinglais (1) observed that estrin production continued in spite of oophorectomy during pregnancy. They found also that there was a marked drop in the estrin in the urine after delivery. Before delivery, the amount was from 740 to 1,200 r u per liter whereas seventy two hours after delivery it was from 40 to 140 r u per liter.

D'Amour and Gustavson found that when estrin was injected before implantation of the

fertilized ovum in rats, the uterine mucous membrane appeared hyperplastic and considerably fibrosed on histological examination and the secretion in the lumen of the uterus contained practically no coagulable material, resembling the secretion which dilates the uterus at estrus. When estrin was given after implantation, pregnancy was terminated by death of the embryo.

The conception of the bat is very interesting in that copulation occurs in late fall, the spermatozoa are retained in the vagina and uterus during the winter period of hibernation, and fertilization occurs in the spring. Zondek (1) was able to produce thickening of the vaginal epithelium by estrin injections. Prolan induced the formation of multiple functioning corpora lutea.

Zondek (8) found that the urine of the stallion contains from 10,000 to 400,000 m u of estrin per liter.

Dohrn, Hohlweg and Schoeller were able to induce sexual edema in the baboon with estrin.

Richter and Hartman reported that, after castration, the spontaneous activity of rats decreased but returned after daily injections of estrin. They suggested that the estrin hormone contains a specific activity factor.

The implantation of pineal gland from an infant rat into a mouse in normal estrus produced inhibition of the estrus. Fleischmann and Goldhammer concluded that the pineal gland in the infant animal produces a hormone antagonistic to the sex hormones.

In his investigations Espinasse found that the outer part of the müllerian tract produces an epithelium which responds to cyclic changes of the ovary. The inner part of the epithelium showed no relationship to the ovarian cycle.

In the cases of 2 women castrated by operation one year previously, Damm (2) was unable to influence the output of Prolan A by the injection of large doses of estrin (46,000 m u in ten days).

Estrin controls not only the proliferative phase of the endometrium but also the growth of the myometrium. Clauberg (2) was able to stimulate the growth of atrophic or hypoplastic uteri associated with no or functionless ovaries by injecting large doses of estrin (300,000 m u of progynon). Huebscher had an even more unique experience when he induced menstruation and stimulated the growth of the uterus in an eighty-year-old woman by injecting 200,000 m u of progynon benzoate and 50 k u of luteohormone. Before the treatment was instituted curettage showed a high grade senile atrophy, whereas after bleeding had occurred a secretory endometrium was found.

Sassobni demonstrated the lack of specificity of estrin by stimulating the growth of the seminal vesicles of castrated animals with injections of estrin. He also produced hyperplasia of the endometrium in castrates with injections of testicle extracts.

A diminution in thyroid activity as the result of injections of estrin (from 300 to 1,000 u of menformon) was ascribed by Heyl, De Jongh, and Kooy to decreased production of the thyrotropic hormone of the anterior pituitary.

Karp and Kostkiewicz discussed the etiological significance of estrin in the development of human colloid stroma on the basis of their results from estrin injections into female rabbits.

Dahl-Iversen's results (1) indicated that the combined estrin-lutein and estrin prolan action producing mammary hyperplasia is physiological. According to Møller-Christensen, pre-operative injections of estrin sensitized the guinea pig uterus to increased reaction to pituitrin *in vitro*.

Keller and Showron found that estrin caused abortion in the early stage of pregnancy by causing death and destruction of the embryo, and in the later stage of pregnancy by disturbing the circulation of the placenta.

Ehrhardt and Kuehn (2) reported studies which they carried out to determine the effect of the hormones of the urine of healthy women during various phases of the cycle on the ovipositor growth of the female bitterling. They considered their method of testing the urine in a 2 liter glass container to be superior to that of Fleischmann and Kann, who injected the substance into the fish. The stimulating action of estrin noted by them in these experiments had not been recognized previously.

Hirst found that when estrin was injected into the newborn the platelet fragility was increased. He suggested the use of estrin as an adjunct to transfusion in hemorrhagic disease of newborn infants.

Corpus luteum

Pratt extracted human corpora lutea by the Corner-Allen method to study their progesterin content. The assay of the human material was paralleled by the assay of a similar product from the sow. Pratt concluded that, in the human female, progesterin may not remain in the corpus luteum as it does after its production in the sow, that it may be present only during a definite period of the cycle, or that it may be present in another part of the ovary.

According to Zondek (4), his experiments demonstrated that the formation of the corpus luteum is dependent upon the anterior pituitary

lobe and not on the maturing ovum. In a rabbit he observed also that when prolan was injected after removal of the ova a follicle developed into a corpus luteum. The gonadotropic hormone of the anterior pituitary produces the maturing of the follicle and the ovum, the follicle rupture, and the development of the corpus luteum. The ovum plays no part in this hormonal development. However, after fertilization has occurred, the ovum is of definite importance in the hormonal process. There follows persistence of the corpus luteum with its reaction on the fertilized ovum and the anterior lobe of the pituitary gland.

Klein studied the corpus luteum of pregnancy in the rabbit histologically and physiologically. He observed that, in the early stages, pregnancy depends on the corpus luteum while later it depends on the uteroplacental unit. Both demonstrated that the effect of the corpus luteum in the rabbit on the uterine musculature is due to the presence of the follicle hormone, estrin. The corpus luteum acts antagonistically to the posterior lobe of the pituitary in its effect on the uterus.

Lipschuetz found a quantitative difference in luteinization effect between the urine of the menopause and the urine of pregnancy. From his experiments he concluded that, in the rabbit, a third gonadotropic hormone is necessary for full ovarian activity. Engle induced luteinization of the ovary of the monkey by the combined use of anterior pituitary extract and an extract of pregnancy urine. He interpreted this result as indicating that the response was due to the synergistic action of two substances on the two participating components rather than as evidence of an "augmentation" effect produced by the combined treatment.

Fiessinger and Moricard (1) demonstrated experimentally an increased elimination of anterior pituitary hormone with diminishing ovarian function.

According to Englehart and Riml, the corpus luteum hormone controls the carbohydrate metabolism of the liver, since injections of the hormone increase the liver glycogen content in rabbits. From other metabolic studies they concluded that the corpus luteum has a metabolic function.

Tausk, De Fremery, Suchs, and Reynolds observed that, in the rabbit, the alcoholic extract of swine corpus luteum inhibited the normal contractions of the uterus but not the contractions induced by pituitrin. The benzene extract inhibited both types.

Brouha and Desclin concluded from their investigations that the corpus luteum has 3 different active principles.

Dahl Iversen (2) found that the breasts of infantile female guinea pigs were stimulated to develop by corpus luteum extract ("Lutex Leo") to a greater degree than those of controls stimulated by estrin injections.

Cramarossa reported that histological studies (2) of the breasts of normal and castrated female guinea pigs which were injected with progesterin revealed 3 phases of change. He suggested the possible hyperluteinemia in women as a cause of Reclus disease but added that further study was necessary.

In studies of the vaginal epithelium of guinea pigs responding to hormonal injections, Desclin observed an antagonism between progesterin and estrin.

MENSTRUATION

Nixon described the physiology of menstruation, correlating the action of the hormones of the pituitary and ovaries on the genitalia. He stated that diminution or absence of the menses is associated with hyperthyroidism, and menorrhagia with hypothyroidism. In diabetes amenorrhea is a frequent symptom, but as a rule occurs only in the late stages of the disease. The influence of menstruation is unfavorable inasmuch as at the menstrual periods there is a rise in the sugar and acetone in the urine. Nixon discussed also the effect of menstruation on constitutional conditions and of the latter on the former.

A most practical presentation of the functional and organic derangements of the hypophysis and their relation to menstrual disorders was presented by Mazer. Mazer discussed the treatment of these conditions, which in this review will be included in the discussion of therapy.

Cramicianu referred to various menstrual disorders and their interpretation by different investigators.

Artificial menstruation was induced in women by Rock with folliculin alone and with folliculin and corporin. Large doses were essential.

By analyzing a large number of accurately recorded menstrual cycles of healthy young women, Fluhmann (2) showed that there is a marked variability in their length.

Macht and Davis have demonstrated the presence of a poison called 'menotovin' in the blood serum, blood cells, sweat, milk, tears, urine, and other excretions of menstruating women.

Fleckner stated that menstrual blood contains no poison but a growth hormone which is evidenced by the influence of the blood on plant growth.

Determinations of estrin in the urine of menstruating women by Antognetti and Genola

showed that the value reaches the maximum in the middle of the cycle, tends to decrease in the second half, and is minimal before menstruation.

Gilardino studied the menstrual blood for hormone content by continuous catheterization of the menstruating uterine cavity. The menstrual blood contained more estrin and anterior pituitary hormone than the circulating blood.

According to Murphy, Shoemaker, and Rea, the effect of the luteinizing extract of pregnancy urine (hypodermic injections of Antuitrin S) during the menstrual period of healthy women produced no change in the subjective or objective characteristics of the co-existing or 2 subsequent menstruations.

Hartman's work with monkeys confirmed the findings of Murphy to a large extent, in that the normal cycle was difficult to disturb to any degree with estrin or an anterior pituitary product (foliutein).

A study of the motor activity in the human female by Billings showed a consistent post-menstrual burst of activity which gradually declined to the time of the succeeding menstrual period. Billings advanced the theory that the subjective tension symptoms common to the premenstrum may be due to hormonal stimulation of the smooth musculature.

Bompiani and David investigated the hormone content of the urine of menstruating and amenorrheic women with reference to the methods of extracting the hormones. They found a close relationship between the estrin content of the blood and urine and menstruation. In one month's investigation of an amenorrhea of two years' duration no estrin but much Prolan A was found. In an amenorrhea of four months' duration there was a rise in the estrin content before the return of the menses and a drop just before and during menstruation. The content was highest eleven and nine days before the return.

Liegner found that, in guinea pigs, resection of one third of the pancreas caused changes in the ovaries characterized by follicle persistence and follicle atresia. In various menstrual disturbances, such as amenorrhea, oligomenorrhea, polymenorrhea, he observed atrophy of the ovary with persistence or atresia of the follicle predominating. He suggested that in such a characteristic syndrome insulin therapy might be of value.

Mussey and Haines studied the basal metabolism rates of women with amenorrhea or oligomenorrhea and found low readings. They suggested thyroid therapy because of their favorable clinical experience with its use.

Zondek (10) described a case of primary polyhormonal amenorrhea which was characterized by a glandular cystic hyperplasia of the uterine mucosa, follicle persistence, and a highly increased secretion of estrin (400 m u per liter, normal output from 200 to 300 m u per liter). Therefore amenorrhea or hemorrhage may result from the same functional process, namely, a too strong and protracted production of follicle hormones or a qualitative and quantitative change in the production of luteobormone.

The structure of the human vaginal mucosa in relation to the menstrual cycle and to pregnancy was studied by Smith and Brunner. The superficial zone is thicker during premenstrual and menstrual phases than during postmenstrual and intermenstrual phases. During pregnancy, this zone is in general about the same as in the menstrual phase. It is thicker in pathological amenorrhea and thinner and looser after the menopause.

Rowe and Guagenty found that menstruation produces variations in the blood picture. All of the factors show a downward tendency during the flow with gradual recovery after its termination. There was no menstrual influence on the differential picture.

Bergauer, Bouček, and Podroužek observed a change in sodium chloride crystals when they are mixed with the blood serum of a menstruating woman. They considered the change due to the hormones rather than to the chemicals which are evident during the menses.

The action of all and of individual endocrine glands on the gonads has been studied. Savignoni (1) demonstrated an inhibiting action of insulin on ovarian function. The action of insulin is enhanced by the increase of ovarian hormones in the blood. Therefore the action of insulin is weak or nil in immature animals. When the anterior pituitary hormones are absent, insulin can scarcely be detected. Consohl (3) confirmed these findings by inducing atrophy in the uterus and a marked reduction in the number and size of the ovarian follicles in female rabbits with small doses of insulin. He cautioned against careless use of insulin for the treatment of obesity as it may produce changes in the sex glands. Kano found histologically a hyperemia of the ovary promotion of the development of the follicle and corpus luteum, and a decrease in atretic follicles after the injection of insulin. He was unable to observe any influence of the pancreas on the fertility of the animals.

Marzetti studied the content of pancreatic diastase in the blood of pregnant women. His findings indicated a hyperfunction of the pancreas

due to the mechanical factor of pregnancy and the effect of the fetal pancreas. Quattrini found evidence of hypofunction of the pancreas in the early days of the puerperium, but after the sixth day on there was a return to normal.

The hyperfunction of the parathyroid glands during pregnancy was demonstrated by Hoffmann and Rhoden by extracting the hormone from the blood of pregnant women by the method of Collip and Tweedy. When the hormone was injected into dogs, a rise in the calcium was observed. After the castration of mature rabbits, Doghotti was unable to observe any histological changes in the parathyroids, whereas the thyroid showed a hyperplasia which did not necessarily indicate hyperfunction. According to Glaubach, hyperthyroidism injures the ability to conceive and to bear, in other mammals as well as in man. Also, during pregnancy there is a physiological hyperthyroidism due to the increase in the thyrotropic hormone from the anterior pituitary. This may become pathological and disturb the pregnancy, as was demonstrated by animal experiments in which thyrotropic hormone of the anterior pituitary or thyroxin caused resorption of the embryo and changes in the ovaries and the thyroid. Herold (2) found that the antithyroid protective material of the blood is lower than normal during pregnancy and in Basedow's disease.

Putziu Doneddu (2) found that thymectomy carried out through 5 generations of rabbits decreased the reproductivity whether it was performed before puberty or on mature animals, but the effect was more evident when it was performed on the young. From his experiments on mice, Keller concluded that the thymus has an antagonistic action on the ovaries. Der Brucke (1, 2) found that injections of thymus extract into pregnant women at term produced uterine contractions for several hours. Larger doses, repeated frequently, initiated labor and carried it to termination. During labor, the contractions were increased in degree and therefore shortened labor. In mild toxemias of pregnancy there was no stimulatory effect from the thymus extract. Der Brucke suggested the possibility that the fetal thymus initiates labor.

Nishijima observed a temporary increased rhythm but persisting increased tonus in the pregnant uterus of rabbits as the result of an injection of a mixture of atonin and thymus extract. Lindblad reported his experiences with the use of thymophysin during labor and gave the indications and contra-indications which must be taken into consideration to obtain favorable results.

Traina Rao presumed that the mammae are glands of internal secretion. He found that the extracts of mammary glands produced atrophy of the uterus and ovaries. Removal of the mammae during pregnancy or the puerperium disturbed the normal puerperium. Mammary extracts were of aid in subinvolution. Anterior pituitary hormones were found by Konsuloff (1) in human milk and the milk of the sheep and cow. The colostrum showed a stronger action. The melanophor hormone was also discovered in colostrum.

The presence of adrenalin in follicle fluid was demonstrated by Macchiariulo. In the cow the concentration was 1:450,000 in the mature and 1:6,000,000 in the immature. In histological and physiological studies Keymer observed hyperfunction of the adrenals during pregnancy.

According to the experiments of A. Aray, the placenta plays an important part as an endocrine gland in the production of the gonadotropic hormone. Rebello Dominguez found many hormones in the placenta such as estrin, progesterone, Prolan A, Prolan B, and a milk stimulating hormone. In placental extract, Fontes found, in addition a contraction stimulating substance not identical with estrin. Donnet using the method of Fontes, was unable to demonstrate a contraction stimulating substance in the blood of women in labor. Bentivoglio studied the effect of estrin and progesterone alone and with pituitrin on the isolated uterus of the guinea pig and rabbit. He observed no definite action except when pituitrin was employed. Gonfianini determined that, regardless of the route used for its introduction, placental extract produced a specific though moderate influence on the blood sugar level.

Nizza (1) found that the liver is influenced by pregnancy to produce more bile but the albumin content of the bile is not raised.

STERILITY

The endocrine aspects of sterility were well presented by Emil Novak (3). The time of greatest fertility was considered to be restricted to from about the eighth to about the eighteenth or twentieth days of the cycle (the usual time of ovulation). The life of the unfertilized ovum is very brief probably not exceeding a day or two. According to Kanus the fertilizing capacity of the spermatozoan disappears after about thirty hours. Therefore, according to the view of Kanus, Ogino, and others, there is a physiological sterile period during the postmenstrual and premenstrual phases. On the other hand Bolaffio, Albrecht,

E. Novak (6), and others have denied the restriction of fertility to any special phase of the cycle because of the extreme variability of the time of ovulation. They believe, however, that the period of fertility is greatest at the time of ovulation.

Sterility associated with functional amenorrhea is attributed to the absence of ovulation, although amenorrhea is not necessarily due to absence of ovulation in all cases. In this condition the endocrines most often involved are the thyroid, the anterior hypophysis, and the ovary.

Other factors to be considered in sterility are defective germ plasma, as suggested by Streeter, and anovulatory menstruation.

The obesity following castration is due to disturbance of the anterior pituitary gland which controls the ketone bodies of the blood. Schultze (2) based this opinion on his experiments with rats and guinea pigs.

According to Liegner, the effects of resecting from one half to two thirds of the pancreas are a decrease of fertility and the degeneration of an existing pregnancy. After the twenty first postoperative day changes were observed in the ovaries. Later these changes progressed to marked atrophy of the ovaries. On the basis of his findings, Liegner described a certain characteristic sterile woman who has decreased insulin function. As a rule the woman of this type is tall and slender, has an enormous appetite, suffers from menstrual disturbances, and does not respond to ovarian preparations.

Hormonal sterilization was induced by injecting Prolan A into mice by Mandelstam and Caikovskij. Schultz using fresh spermatozoa, obtained similar results. Magstris injected large amounts of fresh testicle of the mouse. He emphasized the fact that after temporary sterilization was obtained, other substances (protein and spermatoxic bodies) were injected and might have been factors since deterioration of the general condition of animals is capable of producing a diminution of fertility.

BIOLOGICAL PREGNANCY TESTS

Biological tests for pregnancy have been described since 1794. They have been reviewed by De Wan and Pierson. However, according to W. Hoffman and Robinson and Datnow, the first test described in Berol's papyrus dating back to 1350 B.C. utilized the effect of the patient's urine on barley and wheat. These investigators described the most recent biological tests such as the Aschheim Zondek, Friedman, and Brouha tests. They emphasized that these tests are for

the absence or presence of hormones and must be interpreted in the light of the clinical findings. Servantie also considered the importance of clinical interpretation of the rabbit hormone test in gynecological conditions from the viewpoint of diagnosis and prognosis.

Robson reported an accuracy of 98.25 per cent in 3,151 Aschheim-Zondek tests. In a review of the literature, Mack and Agnew found that accurate results were obtained with the Aschheim-Zondek tests in 96.6 per cent of 8,685 cases and with the Friedman test in 98.5 per cent of 1,899 cases. The various conditions requiring differentiation from normal pregnancy were ectopic gestation, hydatidiform mole, chorionepithelioma, and malignant disease occurring after the menopause (Wodon) and after operative or radiological castration. In the presence of decidual tissue the test may be negative in rare cases in which the tissue between the embryonic and maternal circulation has undergone fibrosis.

Zondek (2) discussed the many conditions which can be recognized by the Aschheim-Zondek reaction, such as chorionepithelioma and teratoma of the testes as well as of the female genitalia. Also by the implantation of a small piece of the tumor or the injection of the tumor extract, the Anterior Pituitary Reactions 2 and 3 may be produced. If 0.02 c cm of morning urine produces a positive reaction, a mole is probably present, while if 0.005 c cm is effective, a mole is certainly present.

For the early diagnosis of pregnancy (from six to fifteen days after the expected menses), Palliez and Gernez suggested a modification consisting of the injection of 30 c cm of morning urine 4 or 5 times into isolated female rabbits after observation of the ovaries following an exploratory laparotomy.

Eherson suggested a modification of the Aschheim-Zondek test to obtain a reaction in from sixteen to eighteen hours. He described a chemical extraction method of the test urine.

According to Rosenblatt and Nathan, the changes in the ovaries of pregnant women and rabbits are similar, although less in degree, than those induced by the Aschheim-Zondek test.

Garrasi found that when test mice were exposed to sunlight filtered through a red or yellow filter the Aschheim-Zondek reaction occurred earlier (at the end of fifty hours) and was more marked. This confirmed the findings of Kuestner and Schulz, who advocated the use of red light to hasten the reaction.

The Aschheim-Zondek reaction has been investigated from many aspects by Settergren,

Snoeck, von Latzka, Eiras, Mack and Agnew, Ruge, and de Snoo to substantiate further its value as a biological test for pregnancy, mole, chorionepithelioma, and other conditions. Davy, Sevringhaus, and Nason analyzed the errors inherent in the reaction, suggested precautions to be observed in the preservation of the test urine and the technique of the test, and advocated use of the rabbit as the test animal. They also emphasized the importance of proper animal maintenance and the value of the lumbodorsal approach to the ovaries. They described a modification of the Friedman method.

Rosselli (2) used the cerebrospinal fluid as the test fluid and found changes in the uterus, vagina, and follicle growth, but no blood follicles or corpora lutea. He studied also the usual test with urine in various conditions, but especially after delivery. He detected retained placental fragments seven, ten, twenty, and twenty-two days post partum. From his studies he concluded that the placenta is a site of prolactin formation.

Levy-Solal and Dalsace reported a case of irregular periods of amenorrhea (due to retarded menses) which were associated with pernicious vomiting. The Friedman test was at first negative, but became positive six days before the next expected period which did not appear. About one month later a six weeks' embryo was aborted.

Menzies and Gentile found the test a less certain diagnostic method for pregnancy in cows than for pregnancy in the human female.

The Friedman test was repeated by many workers (Borras, Buchanan and Hyams, Becker, Spielman, Ornstein, Friberg, DeFilippi, Vesell, Herrera and Schlossberg, Leegaard and Ringdal, Heim, King, Seforans Calvar, Verdeuil, and Young) in series of cases for pregnancy and gynecological diagnosis. Borras stated that in pregnancy the Friedman test is positive after the fourth day of amenorrhea and becomes more intense after the third month. It is negative between the fourth and fiftieth days of the puerperium. It was constantly negative in general diseases and in all local diseases except cancer of the cervix.

Cordaro (2) found that the urine of pregnant women contains a property that, regardless of dosage, at times produces early sexual development of the immature male rabbit or leaves the genitalia unmodified or causes them to undergo atrophy. He therefore concluded that the immature male rabbit treated with pregnancy urine does not lend itself well to the diagnosis of pregnancy nor to the prenatal diagnosis of sex.

Servantie, utilizing the Friedman test, but substituting serum for the urine, established the

following table from 0 to 600 r u (1 r u equals 7.5 m u — Brindeau and Hinglais) when the fetus is dead or the menopause is present, from 1,000 to 4,500 r u in normal pregnancy, and from 10,000 to 50,000+ r u in hydatidiform mole and chorionepithelioma.

Schwarz employed blood plasma (Hoffmann modification) instead of urine in using the Friedman technique and obtained a marked and earlier reaction (twenty-four hours).

Pet emphasized the importance of using rabbits since mice are difficult to obtain in the tropics.

Felding and Neergaard differentiated between the spontaneous follicle hemorrhage resembling a blue-black hollyherry and the induced follicle hemorrhage (Friedman-Schneider reaction) resembling a red whortleberry.

In addition to all these modifications of the Friedman modification of the Aschheim-Zondek test, others have been employed. Hulpieu, Weatherly and Culbertson compared the Kelly test and the Friedman test. The Kelly test consists of the injection of the urine from pregnant women into immature rats, which induces premature opening of the vaginal orifice. Normally, the vaginal orifice remains closed until sexual maturity is reached. Although the Kelly test compared favorably with the Friedman test as to accuracy, it had no important advantages over the latter except lower cost and greater ease of handling of the smaller animals.

Zocchi (1) tried to establish the rabbit unit (0.05 c cm of urine per kilogram of body weight) as the smallest amount giving a positive reaction, although Trettenero (3) pointed out that it has not been sufficiently demonstrated that the single dose of 0.05 c cm urine represents the physiological limits of a normal early pregnancy.

Spirito (2) and Zelickson studied the reaction of ovarian transplants in the anterior chamber of the eye of female rabbits after the injection of pregnancy urine. Zelickson was able to observe positive results within from twelve to fourteen hours, but emphasized the importance of checking the animals with positive urine. Dworzak and Podleschka (2) did not consider this method practical.

Davis, Komkov and Walker observed the pupillary reaction of rabbits immediately after the injection of pregnancy urine into the vein (based on the work of Bercovitz). By operating on the animals, they found positive reports correct in 90.6 per cent and negative reports correct in 81.8 per cent. They concluded that this method requires further improvement, and that if it gave an accuracy more nearly approximating that of

the operative method, the time required for and the expense of the test would be lowered.

Recently attention has been directed to the use of fish as test animals for the detection of the hormones in the urine of early pregnancy. Following the work of Fleischmann and Kann and that of Erhardt and Kuehn (2), Szusz (1, 2) tested the reaction of hormone preparations and urine from various sources (pregnant and non-pregnant women, and males) on the ovipositor of the female bitterling. Although he observed elongation of the ovipositor following the use of pregnancy urine, he obtained the same result with the boiled urine of pregnant and non-pregnant women and male urine. He therefore did not consider the bitterling a proper test animal. However, Kanter, Bauer, and Klawans standardized their fish, that is, determined whether they would respond positively to urine from women known to be pregnant and would not react to the urine from a woman who was not pregnant. Of 31 urines tested, the results checked absolutely with the results of the Friedman test in 27 and showed discrepancies between the 2 tests in 4. Kanter, Bauer, and Klawans listed the many advantages of the use of the bitterling over the use of rabbits and mice after the test has been completely developed and proved to give consistent results.

The frog with its melanophor reaction was utilized by Konsuloff (3). The method consists of the injection of $2\frac{1}{2}$ c cm of pregnancy urine into the lymph sac of hypophysectomized female frogs. From one-half to three-fourths of an hour after the injection the frogs turn a chocolate brown if pregnancy is well established. The maximum coloration generally sets in one and one-half hours after the injection. When early pregnancy is suspected, an additional injection of $1\frac{1}{2}$ c cm of urine is administered one hour after the first injection. An extremely intense coloration sets in from one and one-half to two hours after the first injection. Onufrio discussed this method. Jores and Helbron carried out further experiments with the use of extract of blood serum. They concluded that the melanophor hormone may have no significance in pregnancy. From his studies, Némec concluded that this test is not a specific, but rather a probable, test for pregnancy.

Cuboni presented a chemicohormonic pregnancy reaction in mares. In the urine of the pregnant mare the follicular hormone predominates over the hypophyseal hormones, amounting to from 90 to 95 per cent of the total hormone content, the urine thus differing from the urine of pregnant women. The described test is based on Kober's observation that a fluorescence ap-

appears when the follicular hormone is treated with heat and with concentrated sulphuric acid. In tests of non-pregnant and castrated mares and of stallions the results were always negative. Romaniello applied this method to urines from pregnant women. As the results were not reliable, he concluded that it is not a practical diagnostic method regardless of its ease and low cost.

Stux (2) discussed the various new pregnancy reactions. Voges' reaction was the coloring of pregnancy urine with bromine water a dark red, probably due to histidin. Popoff and Dumitrowa found that pregnancy urine stimulated the budding of cacti. They mentioned also the Bercovitz, Kapeller-Adler, and Paul amino-acid reactions. The Kapeller-Adler chemical pregnancy reaction is based on the detection of histidin in the urine by adding bromine in acetic acid solution followed by an ammoniac-ammonium carbonate mixture, which produces a reddish to dark red solution. Kapeller-Adler found the reaction positive in the fifth to sixth week of pregnancy. Louras found this test often unsuccessful. Ohligmacher's experiences were the same as those of Louras.

Eiras and Gayoso Rojas reported their experience with the Masciotra and Martinez de Hoz methods for the early diagnosis of pregnancy, which are based on an increase of the cholesterol content of the guinea pig's blood after the injection of the urine of a pregnant woman. They concluded that these tests are not reliable. This opinion was substantiated by the work of Aujaleu, Bugnard, Colombies, and Guilhem as well as by that of Gavioli and Savona.

Delfini studied the Donaggio reaction in pregnancy and the puerperium. It has no diagnostic value, but indicates the accumulation of colloids in the organism in certain physiological and pathological conditions.

Afanassjewskij found that after the fourth week of pregnancy the sulphur content of the hair increased. This test proved to be accurate in 96.33 per cent of a large series of cases. In the case of one of the male controls the determination approached that for females and it was found that the control was a eunuchoid individual.

To verify the diagnosis of pregnancy made on the basis of the biological reactions and clinical symptoms, Casas suggested the administration of from $\frac{1}{4}$ to $\frac{3}{4}$ ccm of hypophysin intravenously. Of 20 patients, 16 showed a positive reaction (increased tension of the uterus) and 4 a negative reaction. No harm occurred to mother or child.

Chosson and Donnet (2) determined the amount of hormone in the urine (in units) as an

index of the presence of an intact pregnancy. Spielman, Goldberger, and Frank utilized the Frank-Goldberger method to determine the viability of the fetus. In cases of dead fetus the Aschheim-Zondek and the Friedman tests are positive as long as living chorionic villi are present. The Frank-Goldberger test is positive only when the fetus is alive.

Slotta, Ruschig, and Fels considered the pregnancy hormone to be the corpus luteum hormone. They suggested its determination by extraction, and its standardization so that 4 mgm would produce a positive effect in test animals.

LACTATION HORMONES

From his studies on lactation in guinea pigs, Nelson concluded that the ovarian hormones are active in the production of mammary gland growth during pregnancy, but that they inhibit lactation during that period. With the decline in the ovarian hormone content at parturition the inhibitory influences are removed, the lactation inducing hormone is secreted, and lactation occurs. The maintenance of lactation for extended periods of time seems to be partially under the control of the pituitary hormone, but a more important factor is the stimulation imposed on the secretory tissue by the continual draining of the glands by suckling (Selye and McKeown). Some of these findings were confirmed by De Jongh (1) in experiments on rats.

Anselmino and Hoffmann (1) reported on studies made by them with regard to the lactation-hormone of the anterior pituitary which is specific in inducing milk secretion and can be separated from all the known anterior pituitary hormones.

Sepetinskaja also described the lactation hormone of the anterior pituitary and cited a case reported by Kwater in which a pituitary tumor was associated with a rich colostrum formation.

Mauro found that when large doses of estrin were injected into pregnant rabbits the activity of the mammary glands was inhibited.

Selye, Collip, and Thomson deduced from their experiments on mice and rats that the act of suckling reflexly affects the anterior hypophysis so that the latter continuously produces prolactin, prevents further ovulation, and inhibits the phenomena of estrus.

In experiments on guinea pigs, Traina Rao found that when the uterus is deprived of the mammary secretion it lacks a hormone which exerts an involutionary action on its muscular elements and is related to the retractive phenomena of the uterus. Mammectomy also diminished or destroyed fecundity.

Kuestner warned against the use of sex hormones in clinical cases without further investigation. He suggested the use of anti thyroid protective substances (thyronormon or diiodo thyrosin) to stimulate the formation of milk.

Fomuna found that the alkaloid of ergot can be transferred to the child through the mother's milk.

STERILITY AND HORMONES

Magistris was able to produce temporary sterilization of the female mouse by injecting large amounts of fresh testicle of the mouse. He admitted that this was not a pure hormonal action since both protein and spermatotoxic bodies were injected. He called attention to the well known fact that deterioration of the general condition of the animal is capable of producing a diminution of fertility. Schultz found that the serum of women inhibited the movement of the spermatozoa *in vitro*.

A sterilizing agent for rats and rabbits was produced by Kudrajaschow and Pohikarpowa by decomposing various fats. On the basis of his findings in experiments on rats, Schultze (1, 2) concluded that sterility in obese individuals may be due to a ketonemia. In rats the ketone bodies in the blood are increased by the influence of the anterior hypophysis. This phenomenon may be brought about by castration.

By inhibiting ovulation with injections of Proplan B, Mandelstam and Caikovskij produced temporary sterility in white mice.

Novak (3) discussed the biological factors in fertility and sterility.

CHEMISTRY OF HORMONES

In the Goulstonian lectures for 1934, Dodds (1, 2) presented very interesting data on the synthesis of the hormones. Ketohydroxyestrin is produced by the body. The basic synthetic product, dibenzanthracene, may have additions such as diethyl, di propyl, or di butyl which vary in their estrogenic activity. All of the synthetic estrus producing substances appear to belong to the condensed carbon ring system and the most powerful possess the phenanthrene nucleus. Cook, A. Girard, Lunde, and Butenandt also reviewed recent progress in the chemistry of the sex hormones.

Collip, Brown and Thomson described the chemical composition of emmenin as a hydrolyzable complex containing trihydroxy estrin. Schoeller (1) stated that the addition of 2 H atoms to progynonbenzoate yields a product 8 times more effective.

Borchardt, Dingemanse, and Laquer found that hormone changes occurred in human urine after extraction with heat, benzol, and variation of the acid reaction. A certain acidification increased the hormone content while strong acidification produced no further change.

Vogt discussed the hormone content of mud and moorbathe and attributed their efficacy in menstrual disorders to it.

Guercio studied the effect of the injection of pregnancy serum on the calcium, magnesium, and phosphorus content of the blood of women.

In studying the effect of lights on the hormones, Trettenero (2) observed that ultraviolet light has an inactivating influence on the hormones and a red screened light increases the activity of the hypophysis.

PATHOLOGY AND DIAGNOSIS

The further progress in our knowledge of the endocrines has helped in the solving of many vague general problems. Gernez discussed the medicolegal interest and the importance of biological reactions for the diagnosis of pregnancy, death of the unborn child, rape, and abortion. King (2) discussed the valuable aid given in differential diagnosis in obstetrics by the Friedman test for pregnancy provided its limitations are recognized as in missed abortion. He stated that a positive reaction does not rule out death of the fetus. The relationship between endocrine disturbances and gynecological conditions was discussed by MacBryde in reviewing our present knowledge of the hormones and the clinical syndromes of thyroid and suprarenal disease.

Giacche considered the influence of the genital hormones in producing or predisposing to disease in the female presenting the interesting views of Stamen. The periodical emission of genital hormones produces an excitation of all the endocrine organs of the organism. Thus, when the balance of the vegetative system is disturbed by hypertonia of the vagus may explain vomiting and ptialism. Hypertonia of the sympathetic system allows intestinal atony and gastric distress. The dynamic growth of the uterus with hydatid mole is considered by Giacche as evidence of a marked production of hormones.

Sweeney observed that 30 per cent of a series of normal women showed a gain of 3 lbs or more at some time during the menstrual cycle usually just before the period. He thought that this phenomenon may be due to some endocrine disorder or disturbance of the sympathetic nervous system rather than to changes in the blood constituents or renal insufficiency.

In an interesting case presenting polyuria, polydipsia, glycosuria, hyperglycemia, obesity, dysmenorrhea, and irregular menses the condition was considered to be a hypophyseal syndrome because of the history and the roentgen demonstration of an enlarged sella. At autopsy, the sella and hypophysis were found normal, but the hypothalamic centers appeared grossly to be markedly altered by an infectious and degenerative process. Lhermitte and Pagniez contended that this syndrome should be described as "hypothalamic" or "infundibulotuberal" rather than "hypophyseal."

Trancu Rainer and Vladutiu reported the case of a nineteen-year-old giantess, 215 cm. tall and weighing 150 kgm., who had a hypophyseal adenoma. The quantity of prolactin found in the urine and saliva was equal to that found in pregnancy. When the injected urine produced the pregnancy reaction, the corpora lutea were smaller than when pregnancy urine was used. No estrin was demonstrated.

In the urine of homosexual men, Lundberg (1) found an increased output of estrin. In determinations of the estrin content of the urine of schizophrenic women, Georgi and Fels demonstrated hypofunction of the genital glands.

Starr and Patton found that intramuscular injections of extract of pregnancy urine into 4 persons with hyperthyroidism produced no change in the course of the condition. However, 4 of 5 women younger than the menopausal age were benefited by such treatment.

Stetson, Forkner, Chen, and Rich were unable to obtain any beneficial effect from the prolonged administration of ovarian substances in hemophilia. An intimate relation between the onset of menstruation and the recurrence of attacks of agranulocytosis was described by Jackson, Merrill, and Duane. The use of prolactin (Antutrin S) was found by them to be beneficial in preventing the usual relapse with the beginning of the menses. In studies of 35 patients with agranulocytosis, Thompson considered the possibility that, in some cases of this condition, there may be a relationship between the hormones associated with menstruation and the neutropenic episodes.

Puente discussed the relationship between ovarian insufficiency and dermatoses. He observed menstrual disorders due to ovarian insufficiency associated with dermatoses such as pruritis, kraurosis, scleroderma, acne, eczema, chloasma, urticaria, purpura, and primary exfoliative erythrodermia. In several of these the dermatosis disappeared following ovarian hormone treatment. After considering the various

general pathological conditions of the female in relation to her specific sex hormones, Puente reviewed the endocrine pathology of the female generative tract.

Functional menstrual disorders were studied by Anspach and Hoffman. Histological investigations of large series of women with amenorrhea, with pathological bleeding, and with normal menstruation gave results which indicated that neither amenorrhea nor pathological bleeding has a specific endometrial picture.

Zondek (20) showed that both amenorrhea and hemorrhage may be the result of the same functional process, namely, a too strong and protracted production of estrin or folliculin or both. He called them "polyhormonal pathological pictures" and described a case of polyhormonal amenorrhea with persisting follicle, a highly increased secretion of folliculin, and glandular, cystic, hyperplastic uterine mucosa.

Since the various abnormalities of uterine bleeding during puberty are related to deficient or delayed development of the generative tract associated with the constitutional type of the woman, the hormones may correct these deficiencies, according to Vignali. Dellepiane classified the uterine bleedings of youth and discussed the rationale of therapy based on the pathology.

Hyperplasia of the endometrium associated with a persisting follicle and related to uterine bleeding was described by Tietze (2) and by Szarka (1). This relationship was demonstrated in an ovariectomized woman when bleeding was produced by the injection of ovarian hormones (Szarka). Chilese produced hyperplasia of the endometrium of castrated and non-castrated guinea pigs by subcutaneous injections of prolactin, by the intramuscular implantation of fresh bovine anterior hypophyseal tissue, and by the intraperitoneal injection of alkaline extract of the anterior lobe of bovine hypophysis. The degree of experimental hyperplasia produced was in direct relationship to the intensity of the provoking stimulus.

Frankl described the mucosal vessels of the bleeding uterus. Castaño's definition of hemorrhagic metropathies was the same as the definition given by Aschoff—all cyclic or acyclic uterine hemorrhages that do not arise from an inflammatory or neoplastic process. Castaño called them all "ovariopathic hemorrhages."

An interesting anatomical and hormonal study of metropathic hemorrhage of ovarian origin was reported by Proust, Moricard, and Rodier. These investigators found microcystic ovaries, apparently normal elimination of estrin (folliculin),

and increased elimination of the anterior hypophyseal hormone. They were unable to state whether hypersecretion of the hypophysis or hypo utilization of the ovary was the etiological factor.

Sassi found that 5 of 40 cases of tumors of the female genital tract gave a positive Friedman reaction. The positive results were obtained with 20 cc. of urine, that is, double the amount generally administered for the diagnosis of pregnancy.

Lewis and Geschickter (1, 2) obtained an estrogenic principle from a fibro-adenoma of the breast and from a myoma of the uterus. The myoma yielded also a gonadotropic hormone on tissue assay.

On the basis of clinical evidence (an analysis of 275 fibroids), Witherspoon suggested that fibromyomatous changes in the myometrium occur as the result of ovarian follicle stimulation.

Since there has been a dispute as to the possible influence of the hypophysis on malignant tumors, Bolaffi studied the urine of 39 patients with malignant tumors of the uterus. In only 3 were mildly positive results obtained.

Cornil, Antonioti, and Escarras were unable to demonstrate any gonadotropic hormone in the urine of patients with carcinoma of the cervix, either by the Friedman test or with the interferometer. Israelson, using the Aschheim Zondek technique, obtained only 3 reactions of Grade 1 in 9 cases of portio carcinoma. Fiessinger and Moncard (2) obtained positive results.

The action of the hypophyseal and estrogenic hormones in producing epithelial changes such as hyperplasia and metaplasia has been studied and demonstrated by Hofbauer (1), Pierson, and Busse and Hoevenier.

In cases of uterine carcinoma, Kriesch and Kalman studied the effect of intramuscular injections of prolactin on the weight curve, blood picture, sedimentation time, and rate of growth of the neoplasm. They observed only cessation of weight loss.

OVARY

Probstner reported 2 cases of corpus luteum cysts with interesting hormonal findings. In one case there was an associated hydatid mole. Evacuation of the mole was followed by laparotomy because of ovarian tumors (corpus luteum cysts). The Aschheim Zondek reaction was positive eleven days later. The cyst fluid contained Prolan B and estrin. In the other case, amenorrhea had been present for six weeks, a mass the size of an egg was found on the right side, the Aschheim Zondek reaction was positive, and

there were severe cramps. A diagnosis of ectopic pregnancy was made. Laparotomy revealed a corpus luteum cyst, the fluid contents of which contained estrin but no corpus luteum hormone. The endometrium was of the premenstrual type, thus explaining the delayed menses.

A folliculin cyst of the ovary producing the symptoms of pregnancy was reported by Voigt. Estrin and prolactin were demonstrated. Pezzini reviewed the literature and discussed the subject of ruptured corpus luteum with hemorrhage. Philipp (2) examined the fluid contents of 70 ovarian cysts and tumors. He was able to demonstrate hormones in the follicle, corpus luteum, theca, and parenchymatous cysts, but not in serous cystomas such as papillary and pseudo mucinous cystomas, and not in ovarian carcinomas, dermoids, parovarian cysts, hypernephromas, epioophoron cysts, tubo ovarian cysts, teratomas, or inflammatory adnexal tumors.

E. Novak (4) discussed the ovarian tumors with a highly developed endocrine function—the granulosa cell tumor (feminizing) and the arrhenoblastoma (masculinizing). He mentioned also the dysgerminoma or seminoma which produces no hormone. The characteristics of the granulosa cell tumor of the ovary have been described by Kleins Benda and Kraus, E. Novak (5), E. Novak and Long, Schiller (1), Klasten (1, 2), Bland and Goldstein, Dworzak and Podeschka (3), and Plate. The essential findings reported were sexual precocity, postmenopausal bleeding, and, in some cases, malignancy. Plate described a rare type, the folliculoma lipid (Lecine). Arrhenoblastomas were reported by Phelan, Kleins and Szathmáry.

Two cases of theca cell tumors of the ovary were reported by Melnick and Kanter. A very interesting discussion of their hormonal (estrogenic) influence followed the histological description of the tumors.

Bergstrand described ovarian tumors in 4 cases of hirsutism and reported the findings of microscopic examination of 2 others. From the findings of the microscopic examinations he came to the conclusion that the tumors were fundamentally of the same nature. He therefore considered them to be a combined malformation of the germinal epithelium of the mesonephros and of Wolff's duct or Mueller's duct. The masculinizing effect of corpus luteum extract on guinea pigs was demonstrated by Steinach and Kun in 1931. Bergstrand rejected all earlier theories ascribing hirsutism to the internal secretion of tumors arising in a hypothetical testicular component of the embryonic ovary.

In animals, especially chickens, Kriedet observed the spontaneous changing of sex. In studies of the ovaries he found tumors arising in the medulla and confirmed the theories of Halban, Meyer, and Goldschmidt as to etiology of the masculinizing changes. However, he considered the animals with such neoplasms to be intersexual individuals.

H O Neumann reported 3 cases of virilism and the findings of studies of the ovarian disturbances and the excretion of anterior hypophyseal hormone. He was unable to correlate the hypophysis, adrenals, and genital glands. Kolodny's case of virilism was due to an extraneural rest in the region of the solar plexus.

Langeron and Danes discussed the suprarenal-genital relationship in considering the hirsutism of virilism.

Schiller (2) studied 8 cases of dysgerminoma and identified the tumor in instances in which it was confused with tuberculosis although both lesions have giant cells and epithelioid cells.

PREGNANCY

Gibbons noted that the acidosis of childbirth and possibly a secretion of the liver of the child act as oxytocic agents on the nervous mechanism of the uterus to initiate labor.

Anselmino and Hoffmann (2) have directed attention to the relationship of increased hormone production of the posterior lobe of the hypophysis to the development of nephropathy and eclampsia in pregnant women. The histological changes described by Cushing are the basis for the presence of antidiuretic and pressor substances in the blood in these conditions.

Rupp and Bickenbach discussed the influence of the posterior pituitary gland in the development of eclampsia by inducing changes in the salt metabolism during pregnancy. No explanation for the causal mechanism of these changes was given. Theobald, using an ultrafiltration method (colloidum filter), was unable to identify the antidiuretic substance in the blood with posterior pituitary hormone, but found it was similar to the antidiuretic substance in the liver. He therefore disagreed with the hypothesis of Anselmino and Hoffman. Beato agreed with Anselmino, Hoffman, and Cushing in their pituitary theory of eclampsia and toxic conditions in pregnancy. He believed that the intermediate part in the human hypophysis appears atrophic in a normal condition, but in certain pathological conditions (hypertension) it hypertrophies to such a degree that its elements penetrate into the neural part and probably also into the anterior lobe.

G V S and O W Smith found a marked increase in the gonadotropic hormone in the blood of pre-eclamptic and eclamptic women. The urine also showed a marked difference between normal and pre-eclamptic women, that of the former containing 560 r u of the hormone and that of the latter 3,600 r u. The estrin content decreased in these late toxemias of pregnancies. The findings did not indicate an increased secretion of posterior rather than anterior pituitary hormones. The conclusion was therefore drawn that a quantitative imbalance of these two hormones due to an excessive amount of prolactin and less consistently to subnormal levels of estrin is typical of the toxemias of late pregnancy. Heim obtained evidence of a marked elimination of prolactin and estrin in premature separation of the placenta, in eclampsia, in a case of habitual premature labor, and in a case in which twins were delivered.

Histological studies of the hypophysis in eclampsia by Guizzetti revealed a lymphocytic perivascular infiltration and an exceptional eosinophilic cell in the anterior lobe.

In discussing diabetes and pregnancy, Cannavo reported 2 cases in which improvement of the diabetes occurred during pregnancy. In 1 of these cases, however, the disease returned after delivery. Function of the pancreas of the child or hyperplasia of the islets during pregnancy may have explained the remission.

Consoli (1) found the Aschheim-Zondek test, and Morgantini, the Friedman method, of value in determining the death of placental tissue in cases of retained fetus.

In extra-uterine pregnancy the Aschheim-Zondek and Friedman tests are of value only if they are definitely positive (Goldberger, Salmon, and Frank, Kaplan, Roblee, Spitzer, Morillo Uña, Caretti, and Voogdt).

According to Putzu Doneddu (3), the diminished excretion of hormones is not a cause of habitual abortion, but a result and sign of hypofunction of the whole endocrine system during pregnancy.

A positive reaction produced by a small amount (0.06 c cm) of urine is indicative of a hydatid mole or chorionepithelioma. Therefore the test is of great diagnostic and prognostic value (Mazer, M Y and E B Dabney, M Y Dabney, Flinn, and E B Dabney, Una, Mazza and De la Colina, Brindeau, H and M Hinglais, 2, and Vega). Chevrel-Bodin and Brault, Reeb, Nerson, and Klein, Sawasaki, and Heim found the number of units of hormone per liter of urine to be markedly increased. The lutein cysts of the ovaries associated with hydatid mole or chorionepi-

thelioma contain a large amount of gonadotropic hormone. Siegmund (3) found that after removal of the mole these cysts kept the urinary elimination high for weeks, and that the hormone elimination ceased only when they were removed.

The very great value of the Aschheim Zondek and Friedman tests as diagnostic and prognostic guides in chorioneptelioma was demonstrated by reports of LaFrague and Boursier, Leventhal and Saphir, Beattie, Schwalm, Taketomi, and Lambrough. Leventhal and Saphir, using the quantitative method, found from 20,000 to 333,000 m u of gonadotropic hormone per liter of urine and made the diagnosis on the basis of this evidence. When the neoplasm is strictly limited to the myometrium so that a curette is unable to reach it, the biological tests are especially important (Beattie).

Stoeckl (1) made a microscopic study of the hypophysis of a patient who had a malignant chorioneptelioma.

Stern reported a case of partial hypophysectomy. The patient later became pregnant and gave a positive Aschheim Zondek reaction.

In a case of extragenital chorioneptelioma (retropentoneal teratoma) described by Fenster the anterior pituitary lobe tests were markedly positive. Material from the tumor and metastases was used.

Lassen and Brandstrup studied the urine of female castrates to determine its content of prolan. By their technique, prolan could be demonstrated only when it was present in amounts above 400 m u per liter. The anatomical changes following castration in the albino rat were studied by Langston and Robinson. They consisted of atrophy of all layers and vessels of the uterus which began fourteen days after the castration and reached its maximum by about the forty-ninth day.

Picco (2) observed no effect of prolan on transplanted fibro adenoma in the rat.

The Aschheim Zondek reaction was used in the study of chorioneptelioma of the testes by Chiariello, Ferguson, and Montpelier and Herlant and found to be positive. It therefore has a diagnostic and prognostic value in this condition. Main and Leonard found that the gonadotropic hormone in the urine of a man with a teratoma testis produced follicular changes and no corpus luteum stimulation.

THErapy

The evaluation of therapy based on clinical results is very difficult. Pierra (1) suggested the use of pure hormone rather than extracts. From

his metabolic studies on rats, Guggisberg concluded that the ovaries have no influence over metabolism such as that exerted by the thyroid. He therefore suggested that a combination of ovarian and thyroid preparations be used when indicated. In considering the functional disturbances of the genital tract as being either hypofunction or hyperfunction, Frank, Goldberger, and Spielman were not optimistic as to the value of hormone therapy. Their results from treatment with estrogenic products, pituitary products, insulin, and parathyroid extracts have not been favorable. In some instances of hypofunction of the ovaries they found thyroid of value. On the other hand, Cherry very optimistically stated that in disorders of the menstrual cycle glandular therapy has, on the whole, given gratifying results. He suggested the administration of placental and anterior pituitary crinogens by mouth for the amenorrheas, and of anterior pituitary and corpus luteum crinogens for dysmenorrhea. His experiences with therapy by mouth have been much more favorable than those of most clinicians.

Mazer discussed the functional and organic derangements of the hypophysis and their relation to menstrual disorders.

Hudson and Gocz were able to obtain a therapeutic effect from anterior pituitary therapy in pathological ovarian bleeding. Fuchs discussed the indications and dangers in the use of hypophyseal extracts.

According to Murphy, Shoemaker, and Rea, the normal menstrual cycle was undisturbed by injections of from 1,200 to 2,000 r u of gonadotropic hormone (pregnancy urine hormone) given at various times in the cycle.

Siebert obtained more favorable results with anterior lobe and follicle hormones in amenorrheas of short duration rather than in primary or long standing amenorrheas. J. Novak used combinations of follicle and corpus luteum hormones in amenorrheas. Mayrhofer and Fellner reported the use of menformon to reduce hypertension.

A beneficial effect of ovarian preparations on epilepsy was observed by Kausch and by Balacs (2). Stanca injected ovarian extract into the ovaries of an epileptic with good results.

Naujoks reported the case of a true hermaphrodite nineteen years old who was raised as a girl. The urine contained gonadotropic hormone in an amount similar to that found in pregnancy, and also ovarian hormone. The therapy consisted of excision of the penis and testes followed by the administration of progynon and luteohormone which induced menstrual bleeding.

Sevringhaus and Thornton studied 23 women with definite sexual infantilism (uterine and ovarian hypoplasia plus hypomenorrhea, oligomenorrhea, dysmenorrhea, and atypical hair distribution) Using concentrated extracts of the urine of a pregnant woman, they obtained regular and profuse menses in 10, doubtful results in 7, and negative results in 6 A G Neumann also used this treatment with beneficial results In addition, he applied diathermy to the ovaries and hypophysis Tschertok and Penkow did not observe any influence on the ovaries or endometrium from injections of from 70 to 500 m u of prolactin given a few days before operation to women in the menopause Sexton and Goldberg obtained favorable results in sexually underdeveloped young men with a similar preparation

Thernozatskaia found that gravidan (sterilized pregnancy urine) stimulated the growth of flesh and fat in animals and was less expensive, less toxic, and more potent than prolactin Meigs reported that 54 per cent of a series of patients with abnormal uterine bleeding were benefited by prolactin The good effect of the treatment lasted for from three to eighteen months The bleeding often recurred after three or four months, but responded again to treatment Other investigators (Klingler and Burch, Jonatan, Savirnoni, and Smith and Rock) had the same experience Browne obtained favorable results with prolactin (follutein) in dysmenorrhea

Anker and Laland reported that in 5 cases of hyperemesis gravidarum 2 prolactin determinations in the urine were subnormal and 5 prolactin determinations in the blood were above normal

Catalanotti described the anatomy and action of the posterior pituitary lobe

Lukacs found that he obtained satisfactory results with thyrophysin when it was used under proper conditions Bronzini reported a case of gangrene of the vulva, vagina, and cervix following the use of posterior pituitary extract by a midwife to hasten labor Sepsis followed the delivery and caused death Pituglandol was used by Otto in secondary inertia of labor with good results Doerr reduced the loss of blood in the third stage of labor by the intravenous injection of hypophysis

To induce separation of an adherent placenta from the uterus Baravalle injected hypophysis into the umbilical vein with satisfactory results Tassovatz obtained strong uterine contractions for emptying the uterus in incomplete abortions by intracervical injections of hypophysis

Estrin and progesterin were employed by many investigators (Adler, Mavromati, Buschbeck,

Hawkinson, Arnold-Larsen, Clauberg, 2, Geller, Loeser, 2, Heidler, Borst, Portman, Rock, and Tumis), and certain principles have been evolved from their experiences Large doses, potent preparations, and combinations of estrin and progesterin are necessary in the amenorrheas A Arvay concluded from his animal experiments that the ovarian hormones have a metabolism factor which is organ specific, influencing only the metabolism of the uterus The various conditions treated were amenorrhea, dysmenorrhea, dyspareunia, sterility, habitual abortion, pruritis, fluor, kraurosis, hyperemesis, and premature delivery

Kaufmann was the first clinician to realize the need of large doses of estrin to obtain a therapeutic effect In primary amenorrheas (hypoplasia of the ovaries and uterus), he employed from 1,000,000 to 8,750,000 international units before observing an effect In 1 case, although he used 15,000,000 units in seven months, there was no effect He produced uterine development To induce menstruation, 1,250,000 i u of estrin were given in 5 doses and 35 r u of progesterin over five days For menopausal symptoms of severe degree Kaufmann suggested large doses gradually decreased In irregular uterine bleeding of ovarian origin progesterin proved of value Strassmann, Damm (1), Philipp (1), Szarka (2), and Ahumada had similar experiences Preisacker and Ahumada used smaller doses

In a symposium on the medical treatment of ovarian insufficiency, Marcel, Simonnet, Brandwein, Pierra, Loeser, Craimiciu, and Jonesco discussed the various types of amenorrheas and their inadequate treatment Simonnet and Brandwein used estrin in ovarian insufficiency and sterility Pierra discussed the use of extracts of the whole gland or the pure hormones in gynecology Loeser reported his results from the treatment of primary and secondary amenorrheas with estrin and progesterin Craimiciu and Jonesco used estrin to combat hypertension during the menopause Craimiciu employed large doses of calcium in treating ovarian insufficiency (decreased tonus of the sympathetic and parasympathetic systems) Ovarian insufficiency has been treated also by various physiotherapy methods (Francillon-Lobre, Sosnowska, Pierra, 2, and Halphen, Auclair, and Hossain)

Fabre reported his experience with the benzozate of folliculin, and Kosakae and Ohga their experiences with "pelamin" (a Japanese product of follicle hormone) They obtained stimulation of uterine and ovarian function from these prepa-

rations Tokura had similar results with gynandol, and Fumarola, with estrolast. Horsley observed a beneficial effect from ovarian substances given alone or with mammary, placental, and pituitary extracts by mouth in functional disorders (i.e., neuroses).

Bucura emphasized the importance of a critical attitude toward ovarian hormone therapy. Crainićanu and Kern injected the extracts of corpus luteum intravenously into patients with menstrual disorders. No value of the female sex hormone in hemophilia could be demonstrated by Brem and Leopold nor by Stetson, Forkner, Chew, and Rich. Schiavo reported a case of hemophilia in which ovarian extract proved of value.

Standardization studies of the dose of prolactin and estrin were carried out by Trettennero (2) and by Gad Andresen and Jarlov (2). In investigations of 15 commercial ovarian preparations made in Russia, Ponomarev found that one half of them contained less than 5 m u and the remainder between 10 and 60 m u per cubic centimeter, and that with time their potency decreased. Jorpes reported similar findings in investigations of anterior pituitary preparations.

In addition to reporting a study of the dosage and potency of the product used Albright, Halsted, and Cloney described a method to determine the types of amenorrhea (hypohormonal, persistent hormonal, normal hormonal) and to estimate the success of the treatment instituted.

Bainbridge discussed the use of ovarian hormones and the grafting of ovarian tissue into the uterus after operative removal of the ovaries.

Under certain conditions such as after mutilating operations and in primary atrophy of the ovaries, some investigators (Mayer, 1, 2; Jeanney, Stanca, and Cirio and Murray) found that ovarian grafts may prove of value temporarily or as long as thirty nine months (Stanca). The ovarian grafts were of greater value and survived longer when they were combined with endometrial transplants and the transplants were more likely to take when the transplantation was done immediately after the operation rather than later. Tabai obtained less successful results in human beings than in experimental animals.

Laroche and Meurs Blatter considered general factors such as sports, sunshine, the application of contrast packs to the lower part of the abdomen, and hot vaginal douches as well as hormone therapy in the medical treatment of ovarian insufficiency. In some instances the combination of estrin with thyroid extract made the estrin

more effective. In disturbances of mild degree, the estrin was given by mouth, and in the severe forms subcutaneously. Podzorov and Kulikovskaja found that estrin counteracted the effect of experimental rachitis.

Follmer was able to induce menstruation in 17 cases of marked pulmonary tuberculosis with panhormon (from 500 to 1,200 m u).

Crispolti found only small amounts of ovarian hormone in the ovarian extracts from myomatous women.

The rectal use of boiled pregnancy urine in menstrual disturbances was reported by Warschowsky. Allen and Diddle found that the ovaries of monkeys were not harmed by the continuous injection of estrin for from twenty eight to thirty nine days. Genell (2) obtained increased activity of the uterus in primary and secondary weak pains with injections of from 1,000 to 10,000 m u of estrin (folliculin). On the other hand, Bourne was unsuccessful, although he used doses up to 1,000,000 m u to induce labor. In Genell's study, labor was initiated spontaneously.

Seyringhaus and Guenther found estrin of value to overcome the symptoms of the menopause. Jayle used also other gland extracts (thyroid extract, pituitary extract, adrenalin, and insulin) with favorable results.

In albino rats, Benazzi observed that estrin had an inhibiting effect on the thyroid.

While progesterin has not been produced in large amounts for commercial use, several investigators have been able to study its effect (Kaute, Kaufmann, Bishop, Cook, and Hampson, Krohn, Falls and Lackner, and others. See Estrin). The indications for its use are dysmenorrhea, habitual abortion, menorrhagia and metrorrhagia with no pathological pelvic findings, and (in combination with estrin) the production of menstruation. Bishop, Cook, and Hampson reported dosages for all these conditions although they admitted the difficulty of evaluating the effect of progesterin in threatened and habitual abortion. Courner and Kehl produced abortion after the sixth day of pregnancy with estrin injections and thought that the progesterin was antagonistic earlier and not so potent later.

Elden has very well outlined a method of studying menstrual disturbances of endocrine origin which gives a logical basis for therapy. Menstrual disturbances being due to hypofunction or hyperfunction of the thyroid, pituitary, or ovary, he directed the therapy to the gland responsible. His results indicated that treatment of amenorrhea due to hypothyroidism and metrorrhagia of the midinterval type was favor

able Van der Hoeven also used various gland extracts

Liegner employed insulin in a number of cases of menstrual disturbances in which various treatments, including the administration of estrus-inducing hormones, had failed. This therapy was based on the fact that diabetic women rarely become pregnant, and on the observation that resection of the pancreas in guinea pigs was followed by severe disturbances in the gonads and a marked reduction of fertility.

Gahneltanz, using an extract of placenta, was able to check functional uterine bleeding in all but 1 of 24 patients.

Bakacs (1) treated menorrhagias with parathyroid hormone and calcium gluconate with favorable results.

C and L Gernez found that painful breasts were relieved by estrin injections. Clavel and Bernasconi used placental extract to stimulate the secretion of milk. Dietel (r) suggested the use of either a placental or a pituitary preparation as a galactagogue. Rosenwasser employed an anterior pituitary preparation and obtained inconstant results. In dogs and cats, corpus luteum extracts from young cows produced good results. The best results were obtained with placental extract. In 50 cases the incidence of failure was 20 per cent. Kurzrok, Bates, Riddle, and Miller stimulated milk production with prolactin.

E Novak (3) discussed the endocrine aspects of sterility and suggested stimulation of the hypophysis and ovary by light X-ray dosage for the correction of this condition. He used also hormone therapy. In certain cases, prolan-containing principles (200 r u) were employed to induce ovulation. In the hypogonadal types, estrin and progesterin or estrin and anterior pituitary extracts may be of value. Cordaro also suggested prolan. Tonkes reported a case in which he employed pregnon (anterior pituitary product) successfully. Ratner obtained good results from roentgen irradiation of the hypophysis.

Biedniakoff described 2 new endocrine preparations: metocrin, an extract of the mucosa and musculature of the uterus of the cow, and myol, an extract of the skeletal muscles of the calf. He reported favorable results from the use of these extracts in the treatment of menstrual disturbances, toxemias of pregnancy, menopausal symptoms, and other disturbances such as vaginismus and dyspareunia. Myol was found applicable especially in angiospastic disturbances during menstruation and in the menopause. From his investigations, Biedniakoff concluded that metocrin regulates the ovaries.

Anatomicohistological studies of the endocrine glands of anencephali were reported by Sorrentino. The findings were aplasia of the adrenal cortex, hypertrophy of the thymus, no change in the genital glands, mild hyperemia and small hemorrhages of the hypophysis, and passive congestion and increased connective tissue in the thyroid.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

EYE

Cohen, M. Inflammatory Exophthalmos in Catarrhal Disorders of the Accessory Sinuses
Arch Ophthalmol, 1936, 15 457

The term "inflammatory exophthalmos" is applied to exophthalmos with external signs of ocular inflammation. This condition may involve one or both eyes. It is always to be regarded as serious not only because of the possibility of deterioration of vision but also because of the danger of serious complications such as meningitis, abscess of the brain, and thrombosis of the cavernous sinus.

It is due mainly to a catarrhal disorder of the accessory sinuses. Traumatism causing orbital hemorrhage, pulsating exophthalmos, orbital tumors, general diseases such as tuberculosis and syphilis, focal infections of the alar nasi and lip, metastatic foci, infectious diseases, and rupture of the lacrimal sac into the orbit must be ruled out.

The following factors have prompted the author to consider inflammatory exophthalmos the result of sinus disease: (1) a history of colds with a nasal discharge and positive rhinological and roentgen findings, (2) the exclusion of all disorders other than sinus disease, and (3) the anatomical contiguity of the orbit with the sinuses. In inflammatory exophthalmos, the veins, which are valveless, permit infection to be carried to and from the orbit. The lesions in the orbit depend upon the severity of the sinus infection. If the infection is mild there is a transitory inflammatory edema of the orbit contents whereas if it is severe there will be periorbititis, osteitis, cellulitis, phlebitis, and finally abscess formation.

In the mild acute cases the exophthalmos, the ocular inflammation, and the nasal condition respond rapidly to appropriate treatment. Empyema of any of the sinuses with rupture into the orbit is manifested by a local swelling with fluctuation over the area involved which is accompanied by general symptoms such as pain, headache, and an increase in the temperature.

The exophthalmometer aids in the diagnosis and in judging the results of treatment.

The prognosis is generally favorable in all types of cases, especially if the ocular and general symptoms are not progressive.

LESLIE L. MCCOY, M.D.

Kronfeld, P. C. Anatomical Changes After Cyclodialysis
Arch Ophthalmol, 1936, 15 411

In 1920, Salus, summarizing the facts and theories concerning cyclodialysis, stated that the pressure relieving effect of the cyclodialysis probably depends

on partial atrophy of the ciliary body produced by obliteration of arteries and perhaps also by damage to ciliary nerves. During the gradual development of this atrophy the eye presents the picture of a mild cyclitis. The intra-ocular pressure is reduced because of the decrease in the function of the secretory apparatus. Eyes suitable for pathological study in the investigation of this mechanism must meet the following requirements:

1. The cyclodialysis must have been successful in reducing the tension.

2. The glaucoma must have been in an early stage.

3. Considerable time must have elapsed between the cyclodialysis and the enucleation.

Until 1920 none of the eyes reported upon met these requirements. In most of the cases the ciliary body was atrophic in undialyzed portions as well as in the area of operation.

The case reported in this article met only one of the three requirements, but Kronfeld believes that the pathological findings may contribute to a better understanding of the mechanism by which cyclodialysis lowers the increased intra-ocular tension. The changes in the ciliary body were present only in the area of operation. The undermining had been incomplete as the ciliary muscle had not been separated from the scleral spur (the only explanation of the fact that the spatula did not appear in the anterior chamber during the operation). The operation could not have produced a communication between the anterior chamber and the supraciliary space. Two weeks after the undermining of the ciliary body certain parts of the undermined muscle were found absent or greatly disturbed, and the tip of one ciliary process was affected. The nature and location of the defects indicated that even a very moderate cyclodialysis impairs the nutrition of the ciliary body sufficiently to produce partial necrosis. Two weeks after this has happened the necrotic material has been removed and only reactive inflammation or a young scar is found.

According to Krueckmann, incised wounds of the ciliary body are not followed by the vicarious formation of new muscle tissue. The scars therefore have had a tendency to contract and become smaller. Examination several months after a not very extensive cyclodialysis would probably reveal no striking differences between the muscle on the side operated upon and that of the other side.

The pathological findings in the eye excised in the author's case are reported in detail.

EDWARD S. PLATT, M.D.

MOUTH

Love, A. A. Manifestations of Leukemia Encountered in Otolaryngological and Stomatological Practice *Arch Otolaryngol*, 1935 23 173

In the ear, leukemia may be manifested by otitis externa with the formation of hemorrhagic blebs in the canal and on the drum membrane hemorrhages in the middle or inner ear or in both simultaneously or leukemic hyperplasia in one or both of these anatomical spaces

In the nose there are only two manifestations of the disease. The most frequent is epistaxis and the less frequent leukemia cutis

In the oral cavity the pathological changes are most varied. In some cases the gums are pale and of normal contour whereas in others, they are hypertrophied and spongy, bleed at the slightest touch and resemble the gums of persons with scurvy

In the larynx the necrotic areas may extend downward from the region of the posterior molars or tonsil or appear first in the laryngeal structures themselves, usually as the result of the breaking down of hemorrhagic blebs on the mucous membrane

JAMES C BRASWELL M.D.

Axhausen G. Technique and Results of Cleft Palate Surgery (Technik und Ergebnisse der Gaumenplastik) 1936 Leipzig Thieme

This is the latest work that has appeared in Germany on cleft palate surgery and is one of the most important that has been published

Axhausen recognizes the validity of the objections to the classical Langenbeck operation that have been advanced particularly by Veau but states that this criticism should not apply to the modern

bridge flap operation. He devotes his book chiefly to proving that by his modifications of the Langenbeck technique all the essential requirements laid down by Veau are fulfilled and that the results are superior to those obtained by the Veau operation. His statistics are based on the results in 100 cases treated by him at the University of Berlin. Thirty-seven of these cases are described in detail and the work is profusely illustrated. The essentials for satisfactory results in cleft palate operations are: (1) an epithelial covering on the nasal side as well as on the palatal side of the flaps, (2) obliteration of the dead space above the palatal flaps, and (3) avoidance of muscle injury and union by suture of the divided palate muscles. Veau considers that it is not possible to meet these requirements by using 'bridge flaps' i.e., flaps left with their anterior attachment intact as well as a pedicle posteriorly and has therefore developed his own technique whereby the desired results can be obtained. Axhausen takes the stand that with his technique these requirements can be met by the use of bridge flaps and claims that this method has a wider range of usefulness than the Veau method.

Axhausen prefers to operate at the end of the second year or the beginning of the third year, al-

though it is to be noted that, of his 100 cases only 25 were operated on before the third year. The fact that there was no mortality in the 100 cases he ascribes chiefly to the use of local anesthesia.

The technique of the operation in the early stages does not differ materially from that of the typical Langenbeck operation. A lateral incision is made on each side of the hard palate close to the teeth from the tuberosity forward, and the mucoperiosteum is separated from the bone almost to the margin of the cleft (Fig 1). The hamular process is exposed in the lateral incision and separated with a chisel to allow the tendon of the tensor palati to be carried toward the median line. The palatine artery is isolated near its emergence from the foramen, tied, and severed (Fig 2). The succeeding steps differ materially from the classical operation. At the cleft margin the nasal mucosa is carefully separated from the bone to form a free flap of this tissue on each side (Fig 3). At the posterior edge of the hard palate, instead of cutting the nasal mucosa right through together with the aponeurosis the continuity of this mucosa over the soft palate is carefully preserved, but the posterior bony edge is carefully freed of soft tissue submucously (Fig 4). In the soft palate, the three layers—nasal mucosa, muscle, and oral mucosa—are isolated (Fig 5). It then becomes possible to suture the nasal mucosa across the cleft in a continuous



Fig 1

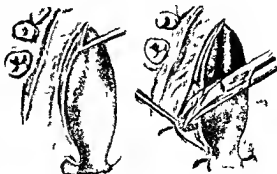


Fig 2

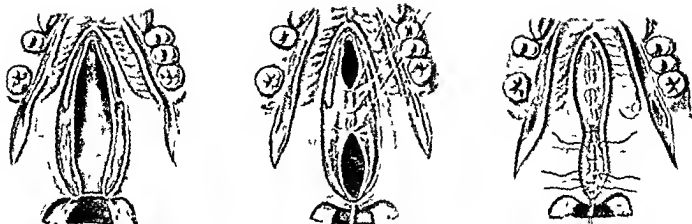


Fig 3

layer from the tip of the uvula to the anterior margin of the cleft (Fig 6). The muscles of the soft palate on each side are then united in the median line with several catgut sutures (Fig 7). Finally, the oral mucosa from back to front is sutured as a separate layer (Fig 8). Packing is placed in the posterior part of each lateral incision, and the flaps are held up in contact with the bone by means of a previously prepared celluloid plate fitting over the teeth.

Figs 9 and 10 illustrate diagrammatically the difference in result of the classical Langenbeck operation and that of Axhausen's modern bridge flap operation. In the former, the nasal surfaces of the flaps are not epithelialized and there is a dead space between the bone and the upper surfaces of the flaps. In the latter, epithelium covers both oral and nasal surfaces of the flaps and the dead space is obliterated by the celluloid plate which holds the flaps up against the bone.

Axhausen describes variations in the technique to take care of special cases, also operations for secondary closure of remaining openings, and retrotransposition for cases of insufficiency of the palate.

Of the 100 cases reviewed, 54 were new and 46 were failures from previous operations. Of the 54

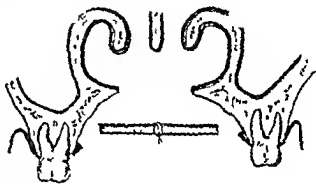


Fig 5

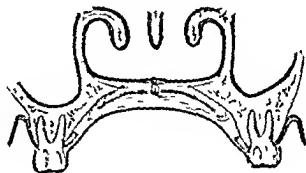


Fig 6

new cases, the soft palate alone was involved in 8 and both the hard and the soft palate were involved in 46. In all of these cases the results were successful. Small openings remained in 2 per cent. Of the total number of cases, small openings remained in 4 per cent. There was only 1 failure. These results compare very favorably with those reported by Veau.

Among other conclusions Axhausen remarks that the Veau methods are of undoubted efficiency in early childhood, but that in the cases of older children and adolescents, and especially for secondary closure after primary failure, the modern "bridge-flap" operation is in his opinion the procedure of choice.

ROBERT H. IVY, M.D.

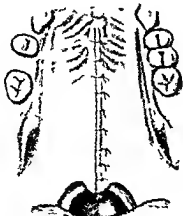


Fig 4

Goodman, M. Nasopalatine Duct Cysts. *Radiology* 1936 26 131

Nasopalatine duct cysts form in the incisor canal region of the maxilla from epithelial cell rests of a persistent nasopalatine duct. They have no direct relationship to the teeth but in their growth may encroach upon the incisor apices. Such cysts produce an expansion of the bony canal lined with epithelium and containing fluid. The onset may be insidious, without symptoms, the cysts being discovered on routine X-ray examination of the teeth. Larger nasopalatine duct cysts may give rise to definite pains which are usually of a neuralgic character and may radiate to the nose or the eyes or along the roof of the mouth. Swelling of the papilla palatina may occur. Tenderness is often elicited on pressure or percussion over the anterior incisor region.

On roentgen examination such a cyst is manifested by a sharply defined area of decalcification in the midline of the anterior part of the palate above the apices of the first incisor teeth. It is demonstrated best and may be differentiated from a dental root cyst by occlusal stereoscopic roentgenograms.

Surgical removal and curettement of the area of the cyst are indicated when repeated swellings of the papilla palatina have occurred or there is a history of neuralgic pains radiating along the roof of the mouth or the nose or to the orbital region. Removal of the upper incisor teeth in the involved area is rarely, if ever, necessary since nasopalatine duct cysts are not of dental origin. When upon expansion, the cyst affects the roots of the adjacent incisor teeth and causes erosion, apicoectomy can be done. In the absence of symptoms or of an increase in size of the area of decalcification caused by the cyst surgery is not indicated.

Four cases are reported and the following conclusions are drawn.

The roentgenologist should consider the possibility of the presence of a nasopalatine duct cyst whenever he observes an area of decalcification in the region of the incisor foramen. Under such conditions he should make special occlusal and stereoscopic examinations to determine the nature of the condition and the relationship of the apices of the adjacent incisor teeth to the cystic area. The error of diagnosing a small cyst as an enlarged incisor foramen must be avoided. In doubtful cases subsequent follow up roentgenographic studies may show enlargement of the area of decalcification and prove it to be due to a cyst. In cases in which the cyst has enlarged to such extent as to encroach upon the tooth apices, the differential diagnosis between nasopalatine duct cyst and root cyst may not be possible from the roentgenograms alone. The history of the case may be of some aid if repeated swelling in the region of the papilla palatina has occurred. A thorough roentgenographic study of cases presenting an area of decalcification in the region of the incisor foramen will be of great aid to the oral surgeon and often prevent the extraction of vital and

normal incisor teeth because of the erroneous interpretation of a root abscess in the routine study.

ROBERT H. IVY, M.D.

Geschickter, C. F. Tumors of the Oral Mucous Membrane. *Am. J. Cancer* 1936 26 536

Practically all benign and malignant epithelial tumors of the mouth are formed from the cells of the mucous membrane. The benign epithelial growths arise in irritations, leukoplakia, or papillomas. Leukoplakia may lead also to carcinoma. The benign lesions include epithelial lesions and mesenchymal tumors. Among the former are cysts, adenomas, aberrant salivary adenomas, leukoplakia, papillomas, and ulcers. The mesenchymal tumors are fibromas, hemangiomas, lymphangiomas, lipomas, and myoblastomas.

The most common precancerous lesion is leukoplakia. This occurs in the mouths of smokers and opposite jagged and dirty teeth. The treatment indicated is strict mouth hygiene. The use of tobacco should be prohibited, and necessary dental work should be done. If the Wassermann reaction is positive, antisyphilitic treatment should be given. Other common precancerous lesions are keratosis and ulceration. While cancer may begin without a preceding ulcer, it is eventually characterized by ulceration with a hard, raised, nodular or papillary edge. It is usually related to chronic irritation.

In the cases of oral tumor reviewed by the author the duration of symptoms was longest in those of lesions of the lips. In two thirds of the latter the history averaged five years, whereas in 90 per cent of the cases of cancer of the tongue the symptoms and signs had been present for a period of only weeks or months. Of the cases of cancer of the gums, cheek, palate, and floor of the mouth, the history of symptoms averaged between six and twelve months in 75 per cent and five years in 25 per cent.

The treatment in the reviewed cases was usually operation performed with the cautery. Some irradiation combined with surgery was given, but the dose was inadequate. In cases of extensive lesions, block dissection with removal of lymph nodes, the floor of the mouth, the tongue, and the anterior mandible was done.

The prognosis is determined by the extent of the disease. Hard, palpable cervical lymph glands are presumptive evidence of metastases. When the nodes are large, fixed, and numerous, there is no hope for cure. When the tumor is radiosensitive and when treatment by surgery or irradiation is adequate, cure is dependent upon the extent of the disease as compared with the extent of the field sterilized by the treatment. When the area involved by the tumor is accessible to both surgery and irradiation, there is little or no choice between the two methods of treatment from the standpoint of cure. Carcinoma of the posterior part of the oral cavity is more accessible to radium therapy than to surgery. Radium irradiation produces less mutilation and is associated with a lower treatment mortality than

surgery. According to Duffy, surgery is preferable to irradiation in the treatment of the cervical nodes. In many cases, however, a judicious combination of surgery and irradiation gives the best results.

CLARENCE C REED, M D

PHARYNX

Salinger, S., and Pearlman, S J. Malignant Tumors of the Epipharynx. *Arch Otolaryngol*, 1935, 23, 140

Of a series of twenty four malignant tumors of the epipharynx, 75 per cent were diagnosed by three pathologists as transitional cell carcinoma.

In three cases the diagnosis of sarcoma was considered, but there was complete agreement with regard to only one of them.

Six of the tumors were diagnosed as lympho-epithelioma. In several, a resemblance to transitional cell carcinoma was noted by the pathologists. The difficulty of differentiating these growths was attributed to inadequate fixing and staining.

In the case of one tumor a diagnosis of epithelioma was made by one pathologist but was contested by the two others.

The early and characteristic symptoms of transitional cell carcinoma are a painless cervical adenopathy, tinnitus or deafness, and pain due to involvement of the first and second branches of the trifacial nerve.

In the majority of the cases reviewed the tumor originated in the region of the eustachian tube of the lateral wall of the nasopharynx, this accounting for the symptoms.

JAMES C BRASWELL, M D

NECK

Herbert, J J. Anatomical and Clinical Study of Thyroid Cancers (*Étude anatomique clinique des cancers thyroïdiens*). *J de chir*, 1936, 47, 40

The author reports a study of forty one cases of thyroid malignancy, giving the pathological classification, the clinical outcome, and the prognosis. He classifies the lesions into the following four groups: (1) transitional lesions between goiter and a malignant neoplasm, (2) typical vegetating epitheliomas, (3) atypical epitheliomas, and (4) hetero typical neoplasms. He states that in cases of hypertrophy of tissue left after an operation for apparently benign goiter the possibility of malignancy should always be considered.

PAUL STARE, M D

Galli R. Thyroidectomy and the Course of Infections. A Morphological Study of the Cellular Reactions in Thyroidectomized Animals (*Tiroidectomia e decorso delle infezioni. Studio morfologico delle reazioni cellulari negli animali tiroidectomizzati*). *Arch ital di chir*, 1935, 41, 571

To determine whether the thyroid has an effect on the course of infections the author infected normal and thyroidectomized animals with bovine tuberculosis. Guinea pigs were used for the experiments as complete removal of the thyroid without injury

to the parathyroids is easier in these animals than in others. Histological examinations were made of the peritoneum, lymphatic glands, and abdominal organs to determine whether an explanation could be found for any effect that the thyroidectomy might have on the course of the infection. The technique of the experiments is described in detail and the histological findings are shown by photomicrographs.

It was found that thyroidectomy affected the course of the infection. The thyroidectomized animals tolerated the infection better than the normal animals. At the end of ten days, all of the controls were dead or dying, while the thyroidectomized animals, most of which were killed after twenty-five days, were still in moderately good condition. One animal was still alive after forty-six days.

Histological examination showed peritonitis in the thyroidectomized animals as well as in the normal animals, but in the former it was always milder than in the latter.

In one series of experiments fresh bacteria were introduced into the peritoneal cavity of thyroidectomized and normal animals to see whether there was any humoral factor in the thyroidectomized animals that tended to destroy the bacteria. None was found. There was no special change in the type of defense reaction in the thyroidectomized animals as compared with the normal animals. The only marked objective finding was the presence of fewer fragmented nuclei in the foci of reaction in the thyroidectomized animals than in the normal animals. As it is known that such fragmentation is caused by the toxins of the bacteria, it may be assumed that the reacting cells in thyroidectomized animals are more resistant than those in normal animals or that the toxins excreted by the bacteria in thyroidectomized animals are less virulent. However, this difference in fragmentation of the nuclei was observed only in the first ten days. Another finding was that the reacting cells were more rounded and showed greater turgor in the thyroidectomized animals than in the controls. This seemed to have some relation to the observations made on vital staining of the organs.

Vital staining showed that the stains were stored in greater amounts and for a longer time in the granulopoietic cells of the thyroidectomized animals than in those of the controls. Apparently, as a result of the slowing of metabolism brought about by the removal of the thyroid, certain foreign materials circulating in the body are stored in greater amounts and for a longer time in thyroidectomized animals. It appeared that the granulopoietic mesenchymal cells had stored the harmful products of the bacteria in greater amounts in the thyroidectomized animals and in this way had protected the body from their action.

AUDREY GOSS MORGAN, M D

Wilder, R M., and Howell, L P. The Etiology and Diagnosis in Hyperparathyroidism. *J Am M Ass*, 1935, 106, 427

There is much accumulated evidence indicating that lack of irradiation with ultraviolet light, or

deficiency of Vitamin D is a very important factor in determining hyperplasia of the parathyroid glands. In experiments on birds, Wilder with Higgins and Sheard showed that this hyperplasia can be prevented, to some extent, by injecting parathyroid hormone in the birds deprived of sunshine and Vitamin D. The conclusion was reached that the ability of the parathyroids to increase the supply of their product represents a compensation mechanism which protects the organism against relative degrees of deficiency of Vitamin D.

It may be asked why diffuse hypertrophy and hyperplasia of the entire parathyroid apparatus is not always found when the supply of Vitamin D is deficient. The answer to this question is that they are always found in chicks but that the parathyroid apparatus of the majority of men and women is capable of increasing its function without hypertrophy.

It may be asked also why a stimulus sufficient to provoke the proliferation of an embryonic cell nest into an adenoma does not cause diffuse hypertrophy of the other glands of the parathyroid apparatus. The answer to this question is that the tumor once formed and functioning assumes the work of the entire apparatus and thus places the balance of the apparatus at rest. Evidence of the resting state of these other glands is provided by the temporary tetany that so frequently follows the removal of a solitary parathyroid tumor.

A lack of Vitamin D can be tolerated by most adult persons without harm but the few in every population who possess the potentiality in question develop tumors of the parathyroid glands. The number of persons with this potentiality will represent the same very small percentage of all populations but if the population of one region is exposed to more stimulation the number of parathyroid tumors developing in that region will of course be greater.

The most frequent complaint is pain in the lower extremities. This is frequently localized in the bones. Such pain, together with loss of tone of muscles, weakness, and lassitude was the outstanding symptom in the experimental hyperparathyroidism of a normal subject studied by Johnson and Wilder. However some patients seem not to have been seriously incapacitated until a fracture occurred and others consulted their physicians because of a tumor of the bone (giant celled tumor) or renal colic. A subsidiary complaint noted in 25 cases was polyuria.

The authors discuss briefly also the tetany which is almost always observed in hyperparathyroidism when the offending hyperplastic parathyroid tissue is removed. Of the records of 109 cases in which operation was performed, this tetany or an equivalent drop in the blood calcium after operation was mentioned in 48.

In this article attention has been limited to the features of hyperparathyroidism which bear on the problems of the etiology and diagnosis of the condition. So intriguing is the subject that knowledge about it has been acquired very rapidly. The disease is unusual and yet although barely ten years have elapsed since its essential pathogenicity was recognized it is understood better than many of the more common diseases. The authors advise care to avoid seeing hyperparathyroidism where it does not exist and to be sparing of surgery unless the evidence establishes the diagnosis. Cases of true hyperparathyroidism are rare, especially in the Central West where an abundance of ultraviolet light is provided. They can easily be recognized by the diagnostic methods at hand and while it is of the utmost importance to recognize them early so that the patient may receive the unquestionable benefit of surgery this is no justification for resorting to surgery in cases that are not clearly instances of the disease.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS, CRANIAL NERVES

Lysholm, E. The Ventriculogram I Roentgen Technique (Das Ventrikulogramm I Roentgen technik) *Acta radiol.*, 1935, Supp. 24

This is the first of a series of 3 monographs dealing with ventriculography. It is based on more than 2,000 examinations and more than 500 autopsies and is intended as a laboratory manual for roentgenologists. The medical material was that of Antoni and the surgical material that of Olivecrona.

In the neuromedical clinic the air (from 20 to 40 cm) is usually first introduced by suboccipital puncture. Injections are made directly into the ventricles (anterior horns) only if the suboccipital puncture fails. In the neurosurgical clinic, where the examination is to be followed immediately by operation, the injections are made directly into the posterior horns (Dandy). After sufficient air has been introduced it is shifted from chamber to chamber and from contour to contour and the roentgenograms are made from as many different angles as are deemed necessary.

In the "occipital position" (axis of the head longitudinal and face directly upward) the air collects in the anterior horns, the anterior part of the third ventricle, and the anterior ends of the tem-

poral horns and, by movement of the tube up or down on its carriage, the incident ray is caused to strike at an angle of from 30 to 35 degrees cephal or caudad from the directly anteroposterior projection. These are Projections 1, 2, and 3. Projections 5, 6, and 7 are identical projections in the "forehead position" (face downward with the forehead on the support). Projection 4 is a lateral projection made with the head hanging over the edge of the table in a dorsally slightly over extended position. Projections 5, 6, and 7 are intended to demonstrate the posterior horns, roof, and posterior recesses of the third ventricle. The purpose of Projection 4 is to delineate the floor of the third ventricle and perhaps the aqueduct and fourth ventricle before the air escapes into the subarachnoid spaces. Projections 8 and 9 are lateral and half axial views with the face downward and the head in ventro flexion. Projection 10, a lateral exposure with the head on its side, is intended to supplement the projections in the occipital and forehead positions. It is of value especially for study of the cella media, trigonum, and temporal horns. Projections 11 and 12 are sagittal and lateral views with the patient elevated from the longitudinal to the sitting posture and the head erect. They are resorted to when the other projections have not sufficiently clarified the upper contours of the lateral ventricles, and are especially valuable in demonstrating the upper contour of the cella media when, because of insufficient



Fig 1 The sagittal half axial picture in the supine position

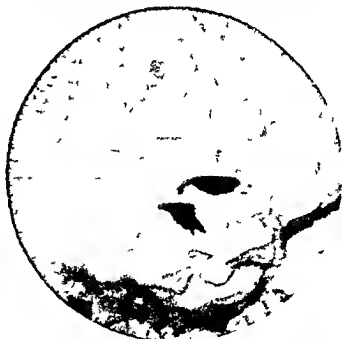


Fig 2 The anterior part of the third ventricle demonstrated with lipiodol

air, this has not been accomplished in the occipital and forehead positions

Iodized oil is used only when pneumography is unsatisfactory. From 0.5 to 1 or 2 c cm of iodized oil of high specific gravity (Ipiodol and Immetol) are introduced into the anterior horn and passed under control of the fluoroscope through the various foramina and cavities of the intracerebral ventricular system. At the end of the examination the effort is made to remove all of the oil from the ventricles because of the irritation it produces.

The article contains numerous illustrations.

JOHN W. BRENNAN, M.D.

Browder J. and Meyers R. Observations on the Behavior of the Systemic Blood Pressure, the Pulse, and the Spinal Fluid Pressure Following Craniocerebral Injury. *Am J Surg* 1936 31: 493

The authors review a series of craniocerebral injuries to demonstrate that the present day teaching concerning the relationship of the systemic blood pressure, the pulse rate, and the cerebrospinal fluid pressure following a severe injury to the head should not be accepted as a basis for diagnosis, prognosis, or treatment in such cases. The recognized classical symptoms resulting from increasing intracranial pressure are presented. From a study of twenty-three cases with initial evidences of severe brain injury at the time of the patient's admission to the hospital the authors conclude that rarely, if ever, is there a measurable increase in the intracranial pressure sufficient to produce medullary paralysis and death in cases of fatal head injuries. The classical signs of increased intracranial pressure—a steady rise in the blood pressure above normal, a steady fall in the pulse rate, a decrease in the respiratory rate, stupor, coma, vomiting—did not occur in their series of cases. As the result of their study and clinical experience they believe that the blood pressure, pulse rate, respiration, and state of consciousness cannot be regarded as an index of the intracranial tension or an indication of the proper type of treatment to be carried out. They found that repeated determinations of the cerebrospinal fluid pressure did not indicate the course of prognosis of the condition. In many of the cases the pressure returned to normal and remained there, yet the patient died.

The authors believe that the treatment of cerebral injury should be based upon the requirements of the individual case rather than upon the classical signs which so often lead to false security and disastrous results.

ROBERT ZOLLINGER, M.D.

Pflicher C. Penetrating Wounds of the Brain. *Ann Surg* 1936 103: 173

A comprehensive survey of the literature on penetrating craniocerebral wounds is presented. The author found a wide difference of opinion regarding the treatment of these injuries and very little experimental work on the subject. In an effort to study

some of the various factors influencing the outcome of penetrating wounds of the brain he carried out a series of experiments on dogs. The experiments were of two general types: first, those in which a short, sharp nail about 2 mm in diameter, was inserted through the skull to varying depths and allowed to remain in place for varying lengths of time, and second, those in which a lead air rifle shot (about 2 mm in diameter) was introduced through a small operative opening in the skull. The nails and shot were not sterilized before they were introduced into the skull.

It was found that foreign bodies penetrating the ventricle which were allowed to remain protruding through the skin invariably produced a fulminating fatal infection. Removal of the foreign body greatly reduced the incidence of fatal infections. The danger of fatal infection was considerably less when the protruding foreign body did not penetrate the ventricle. Closure of the scalp over the inserted foreign body reduced the incidence of fatal infection and prolonged the survival time if infection developed. Foreign bodies deeply embedded in the brain did not produce fatal infection unless the ventricle had been traversed. Early adequate drainage of superficial cerebral infections about protruding foreign bodies greatly reduced the mortality rate.

The author makes the following clinical suggestions:

1. Foreign bodies in the brain which are in communication with the skin, the subarachnoid space or the ventricular system should be removed at the earliest possible moment.

2. Other deeply embedded foreign bodies should be removed only if focal irritation or destructive symptoms are present.

3. If infection already exists about a superficially placed or protruding foreign body, the removal of the foreign body should be accompanied by the establishment of adequate open drainage.

ROBERT ZOLLINGER, M.D.

Sattler E. The Late Manifestations of Brain Injuries and the Results of Operation. (Das späte Krankheitsbild der Gehirnverletzungen und operative Resultate). *Arch f klin Chir* 1935, 181: 718

As early as 1928 the author reported that in some cases of gunshot wound of the head the initial mild or severe symptoms are followed by a state of relative or almost complete health and function which ceases after from ten to fifteen years. There then occur severe gradually increasing motor or sensory attacks, Jacksonian or general epilepsy, and dementia paralytica in which, in contrast to the usual non-traumatic type, the sensitivity of the skin and the pain are increased.

As the condition was previously entirely or practically normal the symptoms are at first ascribed to neurasthenia. Among the motor symptoms the slow and exhausting execution of movement, hesitation in speech, and facial paresis are noteworthy. In other instances there are marked

contractures the upper arm is adducted, the lower arm is flexed at an acute angle the wrist is markedly flexed, the fingers are flexed at the phalangeal joints to form a claw hand, and the thumb is markedly adducted. The leg may be extended and rotated inwardly, the foot in plantar flexion and the toes in a claw deformity. The extremities are cold, bluish and painful. The Romberg, Oppenheim, and Chvostek tests are always positive. The knee reflexes are increased and there is ankle clonus. Gradual mental deterioration occurs with loss of attention, memory, judgment, and will power. The patient may have a tendency toward homicide and suicide. Gradually, lethargy and dementia develop. Epilepsy, true narcolepsy, catalepsy and jacksonian and epileptiform seizures occur in all cases. These are produced not only by injuries of the motor cortex, but also by those of the cortex and subcortex. In injuries of the latter types the author found that the epilepsy always began with tonic convulsions which changed to clonic convulsions.

The causes of these late symptoms are adhesions, cysts, and degenerations. By operation, the entire syndrome may be cured with practically complete restoration of health or working capacity. The site of the operative intervention should not always be at either the point of entrance or the point of exit of the bullet. It should be where the greatest changes are indicated by the clinical symptoms and encephalography. All cysts should be opened and all adhesions severed. When a focus responsible for the epileptic manifestations can be recognized it should be excised to a depth and a width of 1 cm. When the operation is performed in the motor region the venous network posterior to the gyrus centralis should be ligated at two points. The dura should not be sutured, and there should be no implantation of fat. The skull should be closed completely.

Seven very instructive clinical histories of bullet, shrapnel, and artillery wounds from the war period from 1914 to 1915 are reported. Some of the wounds were through and through injuries and some were tangential injuries. All of the operations were performed in 1927 and 1928. There was no mortality. When the patients were followed up after seven years it was found that improvement occurred rapidly and the cure was permanent.

The article includes a report of the histological findings in the removed brain foci and twelve photographs.

(FRANZ) JACOB E. KLEIN, M.D.

Lichtenstein, B. W., and Zeitlin, H. Pontile Abscess. *J Am M Ass*, 1936, 106 1037

Abscess of the pons is rare as compared with abscess elsewhere in the central nervous system. It produces a variable clinical picture, usually with an alternating hemiplegia. The area of the abscess is usually surrounded by a non-suppurative encephalitis, and as a rule an aseptic meningitis is also present.

DAVID J. IMPASTATO, M.D.

SPINAL CORD AND ITS COVERINGS

Babitchine, I. S. The Immediate and Late Results of Chordotomy (Les résultats immédiats et lointains de la cordotomie). *J de chir*, 1936, 47 26

As twenty-five years having elapsed since chordotomy was first suggested by Schiller, it should now be possible to pass final judgment on its value. Nevertheless, opinion remains divided. Lenche and Salman express scepticism regarding the effects of the operation.

This article is based on forty seven sections of the anterolateral tract performed for intractable pain. The pathological conditions responsible for the pain were a malignant tumor in sixteen cases, meningo-radiculitis in twelve cases, pain in an amputation stump in five cases, and tabes dorsalis in one case. In all cases the operation was followed by immediate and complete cessation of the pain with loss of painful and thermal sensitivity. The limits of the anesthesia varied with the level and the depth of the section, in agreement with the theory of eccentric arrangement of the long tracts. As a rule there was an elevation of the temperature with hypotonia of the muscles on the side operated upon. The latter change was probably due to damage to the pyramidal tract. There was no operative mortality.

Complications were muscular atony and sphincter disturbances. Both were transient. Circular pain at the level of the operation occurs in a third of the cases. It lasts for from one to three weeks.

Thirteen of the patients remained under observation for from one to eight years after the operation. Four were completely relieved, five were benefited, and four received no lasting benefit. The least satisfactory results were obtained in the cases of amputation stumps.

Failures were explained by the presence of homolateral tracts for pain and temperature.

ALBERT F. DE GROAT, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Crite G, Jr Pulsating Tumors of the Sternum
Ann Surg 1936 103 199

The author reports a case of pulsating tumor of the sternum proved by biopsy and autopsy to be due to a metastatic hypernephroma. He collected reports of eighteen pulsating neoplasms of the sternum, half probably due to metastatic hypernephroma and half metastatic from malignant adenoma of the thyroid gland. The ratio of men to women in the collected reports was very nearly equal.

In the cases of pulsating tumors due to hypernephroma no urinary signs or symptoms were observed before the appearance of the pulsating mass in the sternum. In only one case did urinary symptoms occur before death. In only four of the nine cases of pulsating tumors of the sternum secondary to malignancy of the thyroid gland was the sternal tumor the main manifestation.

In all of the eighteen cases collected from the literature the tumor occupied the upper portion of the sternum. In one case the entire sternum was involved. The most common diagnoses were aortic aneurism and pulsating sarcoma of the sternum. The author could find no verified case of pulsating primary sarcoma of the sternum reported in the literature.

Aortic aneurism can be differentiated from a neoplasm of the sternum by roentgenographic examination of the mediastinum. If the pulsating tumor is not an aortic aneurism it is probably a metastatic tumor from a hypernephroma or from a malignant adenoma of the thyroid gland.

EARL O LATIMER M D

TRACHEA LUNGS, AND PLEURA

Davis K S Roentgenographic Changes Following the Introduction of Mineral Oil Into the Lung with a Report of Three Cases *Radiology* 1936 26 131

In a review of the literature the author was able to find records of only five cases of lung injury due to oil which were fatal. He reports three cases of such injury coming under his observation, two of which were fatal.

All of the author's patients had used mineral oil in rather large quantities either as a spray in the nose as intratracheal instillations, or as a nasal douche. One patient had used it over a period of six years and eight months. All of them presented unusual roentgenographic findings. These consisted of an increase in the density of the middle or lower lobes. Above this region the density of the lung fields was normal. The involved regions appeared

as areas of milky infiltration giving the lung a definitely mottled appearance. When carefully and closely scrutinized, these areas were found to be accentuations of the finer lung markings which extended to the periphery of the lung fields. In all of the cases oil droplets were found in the sputum.

In the one case coming to autopsy examination of the lungs disclosed an oval mass in the base of each lung. This mass was hard and rubbery, densely adherent to the parietal pleura and circumscribed by a tough fibrous capsule. When the nodule was cut and squeezed, oil droplets collected on the surface. Under the microscope it appeared that in the areas involved the air sacs were either reduced or entirely obliterated. In some areas the air spaces were filled with phagocytes containing numerous oil droplets. In others the alveoli were filled with large vacuoles encircled by a collar of mononuclear phagocytes.

Davis concludes that the presence of oil in the lung produces progressive contraction and eventual solidification of the involved lobe.

J DANIEL WILLEMS M D

Provost P Rymer, M and Togulas G The Roentgen Appearances of Cavities Held by Adhesions and Their Importance in the Management of Artificial Pneumothorax (Les images radiologiques des cavernes br  es et leur importance dans la conduite du pneumothorax artificiel) *Arch m  d chir de l'appar respir* 1935, 10 398

According to the authors, the size and shape of tuberculous cavities in the lung as shown by their roentgen appearance should be considered in determining the indications for artificial pneumothorax. This report is concerned primarily with cases in which the lung fails to collapse promptly after the induction of pneumothorax because of adhesions between the lung and the thoracic wall. Such adhesions are of special importance when they are attached to the lung near the cavity. If under such conditions, the cavity is regular in outline, particularly in its internal contour, the artificial pneumothorax should be continued with a slow and progressive increase in the pressure. When this is done the adhesion is gradually stretched so that room is gained for pleuroscopy and pneumolysis and at times complete collapse with obliteration of the cavity will occur without division of the adhesions.

If on the contrary, the cavity is irregular in outline pneumothorax must be carried out with great precaution because, with increasing pressure such cavities tend to elongate, extend into the adhesion attached to them, and tunnel through the adhesion toward the thoracic wall, thus defeating the purpose of the pneumothorax. Under such conditions the procedure is harmful rather than beneficial. It

should therefore be abandoned and other methods of collapse, notably surgical measures, should be considered

Clear indications can usually be seen only on careful study of a series of roentgenograms

The article includes roentgenograms and case reports
MAX M. ZINNINGER, M.D.

Cabott, H. L., Singer, J. J., and Graham, E. A.:
Bronchography Following Thoracoplasty for
Tuberculosis *J. Thoracic Surg.*, 1936, 5, 259

The authors subjected twenty patients to examination with lipiodol after thoracoplasty. They state that by this procedure the prognosis can be determined with greater certainty. There have been no serious effects from the examination.

The method used consists of the instillation of oil for bronchography. The patient is placed in a good light and instructed to breathe deeply and not to swallow or cough. The tongue is held firmly by the operator and the previously warmed oil is slowly injected so that the stream strikes the base of the tongue. No anesthesia is required except in unusual cases. In the latter, cocaineization of the pharynx is employed. After 20 cc. of the lipiodol has been injected the patient is instructed to lean to the side into which the oil is desired to flow. In cases in which the upper portion of the lung is being studied the patient is placed on his back after all of the oil has been injected. If the roentgenograms are made with the patient in this position and before he coughs the upper bronchi are usually outlined. Later, the patient is told to cough up all of the oil he can. Iodism has occurred in only one case and in that instance was minimal.

The authors recognize that surgical collapse of the lung cannot of itself cure tuberculosis. All it can do is to favor healing of the process by natural means. If lipiodol examination after thoracoplasty reveals that adequate anatomical collapse has been obtained the probability is greater that, in time, the sputum will become negative and the condition arrested.

J. DANIEL WILLEMS, M.D.

Kinsella, T. J.: Surgical Revision of Unsatisfactory Thoracoplasty by Re-Operation and Extrapariosteal (Subscapular) Packing *J. Thoracic Surg.*, 1936, 5, 267

The ideal thoracoplasty in the treatment of pulmonary tuberculosis should produce complete mechanical obliteration of the cavity or empyema pocket and be followed by permanent disappearance of all symptoms, both toxic and local. Unfortunately such a result is not always obtained.

Re-operation in cases in which thoracoplasty has proved unsatisfactory has given improved results in a considerable number of cases. When it is combined with some form of extrapariosteal (subscapular) packing, the results are apparently more certain, although the procedure is somewhat more formidable. The results which the author has obtained to date justify more extensive use of this procedure.

In certain selected cases the application of some type of subscapular pressure at the time of the primary operation seems advisable and may obviate the necessity for re-operation later.

J. DANIEL WILLEMS, M.D.

Rigler, L. G.: A Roentgen Study of the Mode of Development of Encapsulated Interlobar Effusions *J. Thoracic Surg.*, 1936, 5, 295

In general, two concepts of the development of encapsulated interlobar effusions have been presented in the literature. According to one, the accumulation of fluid results from infection of the interlobar pleural cavity itself. The infection may occur independently of, or simultaneously with, an infection of the remainder of the pleural cavity. Most observers consider this to be the usual method by which the process occurs. According to the other concept of the process, an interlobar collection of fluid is the residue of a general pleural effusion.

The author has found that fluid can be demonstrated in the interlobar fissure by making the roentgenograms with the patient in one of the horizontal positions. Fluid was not noted in roentgenograms made with the patient upright. Serial roentgenograms made in cases of lobar pneumonia frequently reveal dense linear shadows which correspond to the position of the fissure. These have been noted to disappear and are probably best explained by extension of a small general pleural effusion into the interlobar space when the patient is in the supine position.

This type of mechanism, which is presented diagrammatically by the author, may be divided into stages. In the first stage, when only a small amount of fluid is present in the pleural space, the fluid accumulates below the dome of the diaphragm and extends upward around the periphery. In the prone or supine position the fluid extends to a higher level and is drawn into the interlobar fissure by capillary pressure. Still more fluid will enter the fissure when the patient is in the lateral decubitus position.

In the second stage, the fluid is increased in amount, reaches the fissure even when the patient is in the upright position, and is manifested by a fine linear shadow. When the patient is placed in the supine or prone position, the shadow becomes broader, and when he is placed in the lateral decubitus position it takes on the oval form of an encysted effusion. If adhesions form in this stage, a true encapsulation occurs and the interlobar space becomes an entity. In this third stage, the absence of free pleural fluid due to drainage or absorption and the position of the patient does not greatly affect the shadow. This is the final stage of an encapsulated interlobar effusion. In most instances spontaneous resorption occurs and encapsulation does not occur. The position in which the patient lies, particularly if he lies on the affected side, will tend to favor the formation of an encapsulated interlobar effusion even when a small amount of fluid is in the free pleural cavity.

EARL E. BARTI, M.D.

Paquet B Pulmonary Atelectasis in the Course of Stenosing Cancers of the Large Bronchi (*L'atélectasie pulmonaire au cours des cancers sténosants des grosses bronches*) *Arch méd chir de l'appar respir* 1933, 10 333

Massive atelectasis may be produced either by an intrabronchial or an extrabronchial epithelioma. The former is usually primary and the latter secondary. The author reports an illustrative case of each type.

Case 1 The patient was a man twenty eight years of age who entered the hospital complaining of attacks of dyspnea, fever and cough with abundant mucopurulent expectoration which had persisted, with several periods of marked amelioration for eighteen months. The left side of the chest was immobile, retracted, and flat to percussion. Breath sounds were absent. The fingers were clubbed. The roentgen signs were those of pulmonary sclerosis or atelectasis. Lipiodol failed to penetrate the left bronchus, and bronchoscopy revealed an obstructing tumor. Autopsy disclosed an encysted empyema occupying the lower two thirds of the pleural cavity and communicating with the lung parenchyma which was collapsed. The lower lobe contained a cavity excavated in tumor tissue. The upper lobe of the lung was riddled with abscesses.

Case 2 The patient was a man fifty eight years old who had suffered from attacks of dyspnea, cough, mucopurulent expectoration and emaciation for nineteen months. Early in the disease there had been one considerable period of remission. The physical findings were limited to the left chest. They consisted of dullness, complete absence of breath sounds over the upper lobe and only a slight blowing over the lower lobe. Roentgenograms showed slight narrowing of the left pulmonary shadow with displacement of the trachea to the left. The upper lobe was entirely opaque. The bronchoscope revealed narrowing of the left bronchus with infiltration of the mucosa. The supraclavicular lymph nodes were enlarged and tender. Death occurred after an illness of twenty months. Autopsy was not performed.

ALBERT F DE GROAT M D

Rienhoff W F, Jr The Surgical Technique of Total Pneumonectomy *Arch Surg* 1936, 32 218

Certain improvements in the technique of pneumonectomy as well as in pre operative preparation and postoperative care have been made in the past two years. The material on which the author's conclusions are based consisted of ten cases in which total pneumonectomy was performed and twenty in which thoracic exploration provided an opportunity for the observation of technical methods.

In the preparation of the patient for the operation it is of greatest importance first, to induce, if possible, a complete collapse of the lung by a gradually induced pneumothorax and second, to produce an inflammation of the parietal and visceral pleura in

order to incite a serofibrinous pleurisy which will be followed by the formation of granulation tissue. The details of the measures by which the inflammatory reaction is produced will be presented by the author in a later communication.

Adequate exposure of the hilus of the lung can be obtained through an anterior incision between the third and fourth rib. Division or resection of a rib is unnecessary.

In the dissection of the hilum on the left side the mediastinal pleura is opened and the mediastinal (extrapericardial) portion of the pulmonary artery is exposed. The dissection is facilitated by clamping the obliterated ductus arteriosus and rotating the artery. The intrapleural portion of the artery is only 0.5 cm. in length as compared with the 2.5 cm. exposed by this method.

All vessels are ligated separately. In the treatment of the bronchus the cartilaginous ring is clipped circumferentially and ligated with an encircling ligature or with interrupted ligatures of silk. It is of advantage to ligate the bronchus within the mediastinum as the surrounding areola is of value in the promotion of healing.

On the right side the superior pulmonary vein is ligated intrapleurally. The pulmonary artery should be dissected within the mediastinum after retraction of the superior vena cava, pulmonary vein and left auricle. A posterior dissection is the safest approach. Careful and meticulous dissection of the lymphatics of the hilus should be done.

Closure is effected without drainage. Serum and plasma accumulations are not tapped. The space becomes obliterated by a fibrinous clot formation. Subsequent thoracoplasty is unnecessary.

Basal anesthesia induced with tri brom ethanol supplemented with nitrous oxide and oxygen is used. Intubation of the trachea is usually not necessary and is probably harmful because of the traumatization of the mucosa.

An oxygen tent is used routinely for from twenty four to forty eight hours after the operation. The patient is kept on the side operated upon in the Trendelenburg position for forty eight hours. After this time the semi sitting posture with a change of position every two hours is advisable.

RICHARD H OVERHOLT M D

Ochsner A and DeBakey M Pleuropulmonary Complications of Amebiasis *J Thorac Surg*, 1936, 5 225

In a previous study the authors found amebic abscess of the liver in 59 (15.2 per cent) of 338 cases of amebic dysentery admitted to the Charity Hospital, New Orleans, in a period of six years. Seven (13.5 per cent) of the cases of amebic abscess of the liver were complicated by extension of the process to the thorax. Involvement of the lung had occurred in 6 and involvement of the pleural cavity in 1.

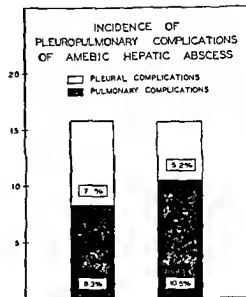
This article is based on 15 cases of pleuropulmonary complications of amebiasis treated in the Charity Hospital, New Orleans in the period from

January 1, 1928 to April 1, 1935, and 153 cases collected from the literature

Of 2,490 cases of amebic abscess of the liver reported in the literature, pleural complications developed in 7.5 per cent and pulmonary complications in 8.3 per cent. Of 95 cases studied by the authors, pleuropulmonary complications occurred in 15.7 per cent. In 7.3 per cent the hepatic abscess had perforated into the lung, in 5.2 per cent it had invaded the pleura, and in 3.1 per cent there was a bronchopleural fistula. In the authors' series of cases pleuropulmonary amebic infections occurred most frequently in the third and fourth decades of life, whereas in the collected series it was most frequent in the second and third decades. Ninety-six and two tenths per cent of the patients with such complications were males.

Pleuropulmonary involvement is usually secondary to hepatic involvement, but the hematogenous form of abscess may develop without involvement of the liver. It occurred in 14.3 per cent of the collected cases, but in none of the authors' cases. There may be a hematogenous pulmonary abscess and an independent liver abscess. Such abscesses were found in 10.4 per cent of the collected series of cases but in none of the authors' series. The most frequent type is that in which the pulmonary abscess is an extension from the liver abscess. This type occurred in 37.2 per cent of the collected cases and in 46.6 per cent of the authors' series. Bronchopulmonary fistula with little pulmonary involvement was found in 19.6 per cent of the collected cases and in 20 per cent of the authors' cases. Empyema due to the extension of a liver abscess occurred in 17.6 per cent of the collected cases and in 33.3 per cent of the authors' cases.

The clinical manifestations in cases in which a liver abscess has extended into the thorax are severe pain in the lower part of the right chest and a distressing unproductive cough which is probably due to pleural involvement. The pain is aggravated by respiration. Of the collected cases, cough and expectoration occurred in 64.9 per cent, fever in 17.9 per cent, pain in the chest in 15.6 per cent, pain in the upper right quadrant of the abdomen in 11.1 per cent, and diarrhea in 9.5 per cent. Of the authors' cases, pain and expectoration occurred in 40 per cent, pain in the chest in 40 per cent, and pain in the upper right quadrant of the abdomen in 26.6 per cent. Of the cases reported in the literature, a history of previous diarrhea was given in 41 per cent and diarrhea was present at the time of the patient's admission to the hospital in 33 per cent. Profuse expectoration with "chocolate sauce" pus is pathognomonic of amebic infection of the lung and indicates the rupture of an amebic abscess of the liver into a bronchus. In the records of 74 of the 153 collected cases such pus was definitely stated to have been present. Of the authors' cases, "chocolate-sauce" expectoration occurred in 14—all of the cases in which there was a communication. In 1 case the abscess communicated only with the pleural cavity.



Graph showing the incidence of pleuropulmonary complications in the collected series of cases and in the authors' series

The chest findings are usually those of consolidation and cavitation. Frequently an erroneous diagnosis of pulmonary tuberculosis is made. The liver is usually enlarged and tender. Hyperpyrexia is characteristically absent. In the authors' cases the highest temperature at the time of the patient's admission to the hospital was 103 degrees F. In the majority, the temperature ranged between 100 and 101 degrees F. As in amebic infections of the liver, there is a moderate leucocytosis without a concomitant increase in the polymorphonuclear leucocytes. In the authors' cases the average number of leucocytes was 18,860 and the average percentage of polymorphonuclear leucocytes, 72.8.

Of the collected cases in which a sputum examination was recorded, amebae were found in the sputum in 79.1 per cent.

The roentgen findings are characteristic. They consist of hugging of the diaphragm into the lower lung field with a shadow extending from this area up toward the hilum of the lung. The shadow is triangular. Its apex is in the region of the hilum and its base toward the diaphragm. A high fixed diaphragm is also suggestive. Of 15 cases studied by the authors, a shadow at the right base was found in 12, elevation of the diaphragm in 11, abscess of the lung in 3, and an abscess with fistula in 2.

The diagnosis of pleuropulmonary complications of amebiasis is not difficult if the possibility of the condition is considered. A history of diarrhea, moderate elevation of the temperature, enlargement and tenderness of the liver, and pulmonary manifestations should suggest the condition. When these are associated with the expectoration of large quantities of "chocolate sauce" pus, a positive diagnosis may be made. Because of its chronicity and the expectoration of bloody sputum, the condi-

tion is likely to be confused with tuberculosis. However, in tuberculosis the involvement is most marked at the apex, whereas in amebiasis it generally occurs at the base and is associated with hepatic involvement. Moreover, in the latter condition no tubercle bacilli are found in the sputum.

The prognosis of amebiasis with pleuropulmonary involvement depends largely on the type of the pleuropulmonary involvement. It is gravest in cases in which a hepatic abscess ruptures into the pleural cavity and best in those in which there is a direct communication between the hepatic abscess and a large bronchus and the pulmonary reaction is slight. It depends also on the type of therapy. Of 30 patients with liver abscess and a bronchohepatic fistula with little or no involvement of the lung parenchyma, 90 per cent recovered, whereas of 27 with a liver abscess complicated by empyema only 22 per cent recovered.

The importance of the use of amebicides is shown by the results obtained in the reviewed cases. Of the collected cases, recovery resulted in 91.9 per cent of those treated with emetine but in only 43.9 per cent of those in which emetine was not given. The corresponding percentages in the authors' cases were 100 and 40. In the collected cases treated by drainage without amebicides the mortality was 48.2 per cent whereas in those treated by open drainage supplemented with emetine it was 15.3 per cent and in those treated with emetine alone it was 5.5 per cent.

The treatment of pleuropulmonary amebiasis should be conservative. Emetine is the best drug but must be used with caution as it is a muscle toxin. It is given in 1 gr. doses daily until from 6 to 10 gr. have been administered. Open drainage is seldom if ever indicated.

HEART AND PERICARDIUM

Clark R. J. Means J. H. and Sprague H. B.
Total Thyroidectomy for Heart Disease. *New England J. Med.* 1936 214 277

The authors report the results of total thyroidectomy performed on twenty-one patients with cardiac disease at the Massachusetts General Hospital, Boston in the period from July 1933 to May 1935.

Nineteen of the patients had congestive failure. Only 2 had angina pectoris. The operation was considered worth while in only about one fourth of the entire series of cases. The relatively poor results were due largely to difficulty in the selection of the cases. At first too severe cases were chosen. Of the cases which were well selected and managed, worth while results were obtained at least temporarily, in 50 per cent. The authors believe that the effects of the operation must be studied further before its value in the treatment of heart disease can be determined definitely.

They are of the opinion that the operation is contra indicated in the following types of cases:

1 Those in which the patient has not been given the benefit of entirely adequate medical treatment over a sufficient period of time for full evaluation of medical care.

2 Those showing rapid progression of the cardiac condition in spite of adequate medical care.

3 Those in which the heart disease is so severe that the patient is unable to establish and maintain compensation on treatment with digitalis and bed rest.

4 Those with high grade mitral stenosis or other mechanical defect giving rise to high venous pressure which is sustained after the restoration of compensation.

5 Those of patients with a low pre-operative basal metabolic rate.

6 Those of patients with severe renal insufficiency.

7 Those of patients with chronic pulmonary disease of any type.

8 Those with malignant or severe hypertension especially if this is associated with generalized arteriosclerosis.

9 Those with active rheumatic infection, bacterial endocarditis or other active infection.

10 Those of patients with recent coronary thrombosis.

11 Those of patients with status angiosus.

There remain certain cases of intractable incapacitating heart disease in which total thyroidectomy is not contra indicated and there is a chance that it may be beneficial. PAUL STARR, M.D.

SURGERY OF THE ABDOMEN

GASTRO-INTESTINAL TRACT

Hauser, H., and Pack, G. T. The Roentgen Diagnosis of Malignant Tumors of the Stomach. *Radiology*, 1936, 26 221

The roentgen signs of gastric cancer are

- 1 Filling defects
- 2 Altered pyloric function
 - (a) Gaping of the pylorus
 - (b) Obstruction of the pylorus
- 3 Advanced position of the six hour meal indicating hypermotility
- 4 Absence of peristalsis in the involved areas of the wall of the stomach
- 5 Diminution of mobility and loss of flexibility
- 6 Diminution of the size of the stomach
- 7 Antiperistalsis
- 8 A niche in the prepyloric region within 2-5 cm of the pylorus
 - 9 Widening of the space between the gas bubble in the cardia and the top of the diaphragm
 - 10 Soft tissue densities in the cardia outlined by the gas bubble

The frequency with which various signs were noted in 240 cases is shown in a table, and the technique of the roentgen examination and the normal roentgenographic appearance of the stomach are described. Numerous roentgenograms showing various types of lesions and involvement of different parts of the stomach are presented, and an unusually early case with minimal roentgen findings and operative confirmation of the diagnosis is reported in detail.

ADOLPH HARTUNG, M.D.

Ewing, J. The Beginnings of Gastric Cancer. *Am. J. Surg.*, 1936, 31 204

The author observed a case of early superficial adenocarcinoma arising at multiple points over a rather wide area of hyperplastic gastritis. If this condition had progressed, it would probably have resulted in a large region of superficial erosion with gradual extension of the disease through all of the coats of the stomach. Ewing suspects that this is the mode of origin of many of the superficial erosive carcinomas of the pyloric antrum in which there is no localized tumor or ulcer, and only a diffuse erosion of the mucosa and infiltration of the submucosa are found. He says that the gastritis is not the usual chronic hypertrophic form with greatly enlarged glands and increased stroma, but one which is highly atypical from the first and changes into cancer rapidly. It suggests the local action of a strongly cancerogenic irritant.

The early literature on gastric cancer shows that the development of adenocarcinoma from multiple foci has frequently been observed and usually occurs

from rather well defined areas with fully developed but small adenocarcinomas separated by normal mucosa. In the case reported by the author there were diffuse atypical changes over the entire affected region without any normal mucosa.

Both of these processes, especially the latter, probably lead in later stages to the wide superficial ulcerating adenocarcinomas found occasionally.

Other ways in which superficial erosive carcinomas begin are known. There is a group of cases in which the superficial epithelium and the epithelium of the ducts remain intact, but the tubular gland fundi break up and the malignant epithelial cells infiltrate widely over the mucosa.

Congenital or acquired structural abnormalities give rise to a small proportion of gastric cancers. Heterotopic intestinal mucosa is frequently found in the pyloric region, and some investigators have traced ulcers and cancers to this origin. Pancreatic islands found in the stomach wall must be considered rare sources of peculiar types of carcinoma. Misplaced islands of gastric glands may be found in the stomach wall.

Carcinoma arising in the ordinary type of chronic hypertrophic gastritis seems to be rare. In the polypoid form of chronic gastritis single or multiple carcinomas are frequent.

These observations on early gastric cancer have a bearing on ulcerocancer. It appears that adenocarcinomas tend to ulcerate at a very early stage. Therefore the presence of islands of cancer in the edges of an ulcer is no indication that the cancer is the sequela of the ulcer.

The occurrence of multiple areas of early cancer in a localized area also complicates the interpretation of cancerous ulcers. If an adenocarcinoma extends laterally by ulceration it may encounter in its advance a second or third focus of primary carcinoma. Segments of the ulcer will then show points of carcinoma developing through gradual transformation of the glands on the edge of the ulcer. These secondary cancers will have no relationship to the original cancer or ulcer. They are all primary independent cancers.

JOSEPH K. NARAT, M.D.

Cole, L. G. Gastric Cancer Correlation of Roentgenological and Pathological Findings. *Am. J. Surg.*, 1936, 31 206

In cases of gastric cancer the roentgen findings discussed with the surgeon should be used in determining not only whether operation is indicated, but also choosing the type of operation to be performed. Complete knowledge of the region of the stomach involved and of the extent and type of the lesion may lead the surgeon to abandon his usual procedure and perform an operation of another type.

The roentgen findings may be used for a practical clinicopathological classification for guidance in determining the treatment and the solving of other cancer problems. The author recommends the following classification based on four roentgenopathological characteristics:

- 1 Regional characteristics: the distance of the proximal line of invasion from the pylorus (a) antral or pyloric, (b) corporeal, (c) cardiac and (d) fundic.
- 2 Obstructive characteristics: the protrusion of the growth into the lumen of the stomach (a) obstructive, (b) non obstructive.
- 3 Infiltrative characteristics: (a) infiltrative, (b) non infiltrative.
- 4 Protruding characteristics: the character of the protrusion of the growth into the lumen of the stomach and its surface characteristics (a) protruding, (b) non protruding.

Cole states that all of these roentgen findings are practically identical with the gross pathological changes.

JOSEPH K. NARAT, M.D.

Harris, S. The Early Symptomatology and the Diagnosis of Gastric Cancer. *Am J Surg* 1936 31: 225.

The author states that in thirty years' experience in his private practice he has encountered only one patient with cancer of the stomach who came early enough for a cure. This is explained by the fact that the early symptoms are so vague and indefinite that they often do not worry the patient or are unrecognized by practitioners until too late. All of the manifestations of gastric cancer described in the textbooks are those of the late stages of the disease. Among these are a palpable tumor, pyloric obstruction, a lemon yellow color of the skin, loss of weight, and anemia.

Certain indefinite symptoms in a patient in the cancer age should lead the physician to have a roentgen examination made by a competent roentgenologist. Such symptoms are described as "a little indigestion," "a below par feeling," "easy fatigue," "intestinal flu" or "an indescribable abdominal discomfort and loss of appetite."

Pain is an inconstant symptom in gastric cancer. When it is present it is often not related to or made worse by meals. Nocturnal pain is more constant in gastric cancer than in most other abdominal lesions. As a rule the pain extends over a larger area than in cases of ulcer. Nausea without apparent cause is often one of the early symptoms of gastric cancer. Vomiting is usually a late symptom. Achlorhydria is of no value at all in the diagnosis of gastric cancer.

The author concludes that roentgen examination reveals the earliest possible evidence upon which a diagnosis of gastric cancer can be based, but only if it is made by a competent roentgenologist. Even in the presence of a negative report the author favors exploration by a surgeon who, if the stomach is found negative for cancer, can correct whatever pathological condition may have been responsible for the symptoms.

G. DANIEL DELPRAT, M.D.

Dublin, L. I. The Incidence of Gastric Cancer. *Am J Surg*, 1936, 31: 197.

Cancer of the stomach is responsible for about one third of all cancer deaths of males. More than 3 times as many deaths of males are due to cancer of the stomach than to cancer of either the liver, the gall bladder, or the mouth, the next most frequent cancers in males. Among females, the mortality charged to gastric cancer is one fifth of the total mortality from cancer and is exceeded by the mortality from cancer of the uterus. In 1932 the total number of recorded deaths of males from cancer of the stomach in Continental United States was 16,000 and the total number of deaths of females from that condition about 11,000. Therefore approximately 27,000 annual deaths in the population of the United States are due to gastric cancer. On the basis of these figures the crude death rate from gastric cancer in the general population of the United States is now about 21.6 per 100,000 of population.

Cancer of the duodenum is responsible for only 1 per cent of the total cancer mortality of males and about 2 per cent of that of females.

Gastric cancer, like other internal cancers, is frequently not diagnosed and hence not reported as the cause of death. The number of deaths attributed to this disease is therefore incomplete.

As nearly all cases of gastric cancer result in death within a short time after diagnosis the mortality figures are a good indication of the incidence of the condition.

The author reports the incidence of cancer of the stomach in the industrial policy holders of the Metropolitan Life Insurance Company for the seventeen year period from 1917 to 1933.

The findings in this large group of insured persons are in all essential respects parallel with those in the general population except that they are limited to the ages between one and seventy-four years. In the period reviewed there were 40,573 deaths from gastric cancer. The figures show that the incidence of the condition increases with advancing age and is much higher in the males than in females. In the white race it is from a third to a half higher in the former than the latter. There is evidence that this excess in males is increasing because of the decline in the gastric cancer death rate in females.

From the data reviewed the following inferences seem warranted:

1. In the United States, the stomach is the principal site of fatal cancer in white males and very probably also in white females.

2. The incidence of gastric cancer is approximately 50 per cent greater in white males than in white females.

3. In white females the death rate from gastric cancer and by inference, the incidence of gastric cancer appear to be decreasing at a rate greater than can be attributed to chance alone. In males the death rate has shown a slight tendency to increase but this is statistically significant only at the more advanced ages.

JOSEPH K. NARAT, M.D.

Pack, G. T., and Scharnagel, I. M. Palliative Irradiation of Inoperable Gastric Cancer. *Am J Surg*, 1936, 31 247

During the last three years the authors have used irradiation therapy in sixty cases of gastric cancer, chiefly for palliation in the painful advanced stages of the condition. Radium in the 4 gm radium-element pack, radon in gold seeds, roentgen rays, and combinations of these agents have been used in definitely measured doses. In some cases good results were obtained. The fact that possibly 10 per cent of gastric cancers are radiosensitive makes irradiation therapy justifiable in inoperable cases, but the method certainly cannot be offered as a substitute for surgery in the operable group.

For external irradiation the radium element pack seems preferable to the roentgen rays. If roentgen rays are used, the fractionated method with several portals will permit the administration of a larger dose to the tumor. Pre-operative irradiation is to be discouraged except in cases of two stage resection, in which irradiation therapy may be attempted in the interval. As a supplement to external irradiation the interstitial implantation of gold radon seeds into cancers of the cardiac end of the stomach may be attempted through a gastrostomy stoma or an opening made by the formation of a costochondral rib flap. Prophylactic irradiation in cases in which radical resection is done is not a routine procedure at the hospital with which the authors are associated.

The complications which may follow irradiation in gastric cancer include necrosis with fistula formation, peritonitis, and hemorrhage from the stomach. Irradiation sickness is frequent.

T. LEUCUTIA, M.D.

Sénèque, J., and Marx, C. The Functioning of the Stomach After Gastrectomy (Le fonctionnement de l'estomac après gastrectomie). *J de chir*, 1936, 47 1

As gastrectomy has become a common operation only in recent years, reports dealing with the late results are few, at least in France. However, the effects of the operation on the motor and secretory functions of the stomach have received considerable attention in the American and German literature, some studies going back as far as twenty years. In this article the authors discuss the effects of gastrectomy on the motor functions of the gastric stump from the point of view of the surgical technique and certain clinical problems. Their material consisted of 265 gastrectomies performed between 1920 and 1934. Forty per cent of the patients could be followed after the operation. The types of gastrectomy included the Billroth II, the Kocher, the Polya, and the Finsterer.

On fluoroscopic examination the gastric stump has the form of a funnel. There is nothing noteworthy about the method of filling. Theoretically there should be no peristaltic movements. This is the case unless a portion of the antrum has been

left intact. The functioning of the stoma is variable. Even after gastroduodenostomy the stoma is rarely incontinent. As a rule evacuation occurs rhythmically. The time required for emptying of the stomach ranges from thirty to ninety minutes. The stoma of a gastrojejunostomy functions in a similar manner, but the stomach empties more slowly.

A phase of hypotonia and dilatation of the gastric pouch always occurs. It has been studied as early as the fifth postoperative day. It is accompanied by hypersecretion, and lasts for from six to twelve weeks. Equilibrium is reached only after several months.

Retrograde filling of the afferent loop of bowel is quite common. The cause in most cases remains uncertain, but when very marked filling is noted an obstruction in the efferent loop should be suspected. The technique has little influence on this phenomenon, but in general it seems best to employ a short loop in making the anastomosis. The authors favor the gastrojejunostomy of Hofmeister and Finsterer with a short anopercistaltic loop and a stoma from 7 to 8 cm long.

Of the postoperative disturbances which frequently occur but can scarcely be classified as complications, the most important are vomiting and distention which mark the initial atonic phase. Unless these are due to organic obstruction they are amenable to gastric lavage and antispasmodics. During the period of adaptation, that is to say, for some months, a sense of fullness may be noted immediately after eating or hunger may be experienced within an hour or two. These symptoms subside after from ten to fifteen months.

ALBERT F. DE GROAT, M.D.

Dixon, C. F., and Stevens, G. A. Carcinoma of the Intestine. Plastic Type Involving the Intestine. *Ann Surg*, 1936, 103 263

The authors review in some detail six cases of carcinoma of the linitis plastica type involving the intestine. These cases, with the thirty seven found in the literature, bring the total number reported to date to forty three.

Available data suggest that, although the condition is no doubt rare, it probably occurs with greater frequency than is indicated by the number of cases reported. Although, as a whole, the group of cases observed at the Mayo Clinic is of interest chiefly because of the rarity of the lesion, two cases are of more interest because of the prominence of symptoms referable to the colon, namely, those of obstruction, and one case is of special interest because the patient is still alive eleven years after exploration. The growth in the latter case may be benign, although the question of spontaneous cure of cancer arises. Clinical diagnosis is difficult. In all of the sections studied microscopically at the Clinic, malignancy was demonstrated. Without exception, the primary lesion was found in the stomach.

Because of the usual presence of multiple metastatic growths in addition to the gastric lesion when

linitis plastica has reached the stage of intestinal involvement other than palliative forms of treatment are futile

Edwards H C Diverticulosis of the Small Intestine *Ann Surg* 1936 203 230

The vast majority of acquired diverticula of the small intestine are of the mucous membrane hernia type similar to the pouches found in the large bowel. The first complete description of multiple jejunal diverticula was published by Sir Astley Cooper in 1844. The patient was a man sixty five years of age. Since then numerous cases of diverticula of the small bowel have been reported.

The author's material consisted of six postmortem and three operative specimens of acquired diverticula of the jejunum and ileum. Unlike duodenal diverticula pouches lower down in the small intestine are difficult to detect by roentgen examination. In seven of the cases reviewed by Edwards from one to eighteen diverticula were found in the jejunum. In two of those in which operation was performed a solitary diverticulum was discovered in the jejunum, and in one in the ileum and lower jejunum. His pathological examination of eight of the diverticula showed that they were all of the acquired type. In all but one instance the pouches arose from the mesenteric side of the small bowel. In one instance a malignant growth was found associated with the pouch. The average age of the patients was fifty six years.

Of a total of twelve cases from all sources multiple diverticula were found in five and a single diverticulum was discovered in seven. The site of herniation of the mucous membrane through the wall of the intestine corresponded to site of entry of the blood vessels. In all but one case the diverticula were on the mesenteric aspect of the intestine. In large diverticula the fundus is completely devoid of a muscular coat. This is because the diverticulum increases in size chiefly at the expense of the mucous membrane and submucosa and eventually there is not sufficient muscular tissue in its wall to "go around". The diverticula discussed are acquired deformities of the bowel wall. The causal factors are the presence of a weakened area in the bowel wall together with a pulsion force acting from within the bowel which initiates the process of herniation. The origin of jejunal diverticula corresponds exactly to the point of entry of the blood vessels through the muscular coat.

The two outstanding symptoms common to diverticula of the jejunum are (1) vague abdominal pain occurring at an interval after meals and (2) flatulence corresponding in time with the pain. It must be admitted that the symptoms of jejunal diverticulosis are not sufficiently characteristic to warrant a diagnosis of diverticulosis. Roentgen examination is the final criterion. Rarely do jejunal diverticula give rise to cholelith symptoms. When symptoms occur the best treatment whether a single diverticulum or multiple diverticula are present is

resection of the affected portion of the gut with end to end or side to side anastomosis

JOHN W. NUZZUM M.D.

Gatersleben H A Contribution on Polyposis of the Small Intestine (Beitrag zur Polyposis des Duendarmes) *Deutsche Zeitschr f Chir* 1935 245 628

The author reports the case of a girl who was subjected to laparotomy at the ages of nine, seventeen and twenty years because of the symptoms of chronic ileus. The cause of the invagination found at the first operation in which resection of the jejunum was done is not known. In the subsequent operations the cause of the ileus was found to be an invagination produced by a polyp in the small intestine. The involved portion of bowel contained also several other polyps of various sizes. Although the polyps were removed after the small intestine was opened in the second operation, another resection was necessary in the last operation. Since the third operation the condition of the patient has been good. After the last resection no more polyps could be discovered in the rest of the small intestine or in the colon.

The author presents a review of the literature on polyposis of the small intestine. It has been found that polyposis of the small intestine is definitely an affliction of the young. Heredity plays a role in its development. The main clinical sign of the disease is invagination. Polyposis of the large intestine differs from polyposis of the small intestine in being generally a disease of mature age and in its clinical picture which is usually characterized by the appearance of blood and mucus in the stools. Polyposis of the small intestine is found more often in females than in males while polyposis of the colon is more common in males.

On the basis of the studies of Schmieden and Westbues the development of carcinoma from polyps of the colon has long been known. In the case reported by the author histological studies demonstrated that carcinoma had developed from the polyps of the small intestine.

(E. SCHMUTZLER) CLARENCE C. REED M.D.

Greenblatt R B, Pund, E R and Chaney R H Meckel's Diverticulum *Am J Surg* 1936 31 285

A case of intussusception with an inverted Meckel diverticulum presenting a well defined callous peptic ulcer at its tip and a case in which a Meckel diverticulum showed an apical submucosal tumor composed of fetal pancreatic and bile duct systems led the authors to undertake a detailed study of the histopathological findings and symptoms in cases of Meckel's diverticulum particularly with reference to heterotopic tissue and the classification of possible surgical complications.

In 9,000 laparotomies 18 cases of Meckel's diverticulum were found. The average age of the patient with such a diverticulum was twenty seven years.

THE MORE FREQUENT LESIONS OF MECKEL'S DIVERTICULUM

Group	Findings	Symptoms
Peptic	Gastric mucosa { without ulceration with ulceration ulcer and hemorrhage ulcer and perforation	1 May simulate duodenal ulcer 2 History of intestinal hemorrhage 3 Peritonitis due to perforation
Obstructive	Intussusception Volvulus Bands and adhesions Contents of inguinal or femoral hernia	Signs and symptoms of intestinal obstruction varying from chronic to acute, partial to complete obstruction
Diverticulitis	Simple acute Acute with perforation and gangrene Chronic	Symptoms essentially those of appendicitis
Umbilical	Fecal fistula Umbilical adenoma Prolapse of intestine through umbilical fistula	Lesions of the umbilicus often associated with an underlying omphalomesenteric duct
Tumor	Benign { enterocystoma carcinoid adenoma mesodermal tumors Malignant { carcinoma sarcoma Heterotopic { pancreatic tissue embryonal rests	Symptoms of bleeding, intussusception, or obstruction
Incidental	Intestinal structure normal	None

The ratio of females to males was 3:2. In 5 cases the diverticulum was symptomless and found incidentally at operation for some other abdominal condition. In 6 cases inflammatory processes were present and in 7 there was intestinal obstruction of varying degree. In 2 cases intussusception, and in 1 case volvulus, had occurred. In 1 case an umbilical fecal fistula was cured by excision of the diverticulum. Three cases showed heterotopic tissue. The more frequent lesions of Meckel's diverticulum are shown in a table.

Meckel's diverticulum should be looked for in all laparotomies, and the possibility of its presence should be considered in all cases of umbilical anomalies or vague para umbilical pain, acute abdominal conditions, hemorrhage from the bowel, and obstruction of the intestines.

WILLIAM E. SHACKLETON, M.D.

Kunath, C. A. The Surgical Treatment of Chronic Ulcerative Colitis, with Special Reference to Appendicostomy or Cecostomy Tube Irrigation. *Arch. Surg.*, 1936, 32, 302.

Twenty years ago ulcerative colitis was regarded as a disease belonging entirely to the field of internal medicine and the surgeon was called on only to treat certain complications that arose. The large number of methods of treatment employed today and the high mortality rate still prevailing make it obvious that the ideal method of treatment has not yet been found. The surgical procedures that have been

developed have one of the following purposes: (1) the provision of an avenue for direct irrigation of the diseased bowel (e.g., appendicostomy), (2) the establishment of a condition of physiological rest for the diseased bowel by diversion of the fecal stream (ileostomy), or (3) eradication of the disease (partial or total colectomy). On the whole, the results are still far from encouraging. While ileostomy is the accepted treatment in most clinics, the more radical colectomy appears to be gaining in favor.

During the past four years Kunath has treated a number of cases by the more conservative cecostomy or appendicostomy with subsequent irrigation of the diseased bowel through a tube.

To evaluate the relative merits of the various operative procedures he studied thirty-five cases of chronic ulcerative colitis. He has found appendicostomy and cecostomy with subsequent irrigation of the diseased bowel segments useful procedures in selected cases. In eighteen cases in which this type of treatment was used the typical course was one of immediate improvement. However, this improvement is usually too encouraging because it does not accurately portray the end result. After about one year, it usually ceases. If the patient stops the irrigations, his general condition rapidly declines. Roentgen examination shows the colon continuing to narrow and foreshorten and gradually becoming of the "garden hose" type. Cure results rarely if ever. Kunath prefers to regard the irrigation type of therapy as a compromise between strictly medical

treatment and ileostomy. It seems to be a safer operation with less discomfort to the patient than ileostomy. The patient should not expect a cure and should be prepared to accept the tube as a permanent handicap. Moreover, he must face the possibility that more radical surgical intervention may be necessary later. Cecostomy and appendicostomy improve the general condition and render the patient a better risk for subsequent more radical surgery. They are contra indicated when the disease is in the acute phase with many stools and a high fever as irrigations at this time may provoke further bleeding and even spread the disease. There is no ideal method of treatment that can be applied routinely to all cases. Kunath believes that at the present time surgery has something definite to offer, but the procedure used must be that which best meets the requirements of the individual case.

JOHN W. NUZUM, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Zanardi F. and Previtera A. Contributions to the Functional and Anatomical Study of the Liver in Diseases of the Extrahepatic Biliary Tract (Contributi allo studio funzionale ed anatomico del fegato nelle malattie delle vie biliari extraepatiche) *Arch. ital. di chir.*, 1936, 42, 205.

The authors studied the condition of the liver in cholecystitis with or without calculi in icterus in the course of lithiasis, and in obstructions of the common duct by tumors and scars. Their procedure consisted in testing the function of the liver a short time before operation making a biopsy during the operation subjecting the gall bladder bile to bacteriological examination and then, if possible, making postoperative tests of liver function and following the patient up for several months or even years. Their object in this article is to show the value of a comparison between the findings of histological examination and those of functional tests.

The functional tests made were the test for bilirubinemia, the diazoreaction of Van den Bergh, the Takata reaction, Bufano's amino acidemia curve, the bromsulphophthalein test and the test for alimentary galactosuria. The authors describe the methods of making these tests and present curves showing their significance in the different conditions. They then discuss liver biopsy in detail and present photomicrographs showing the findings in different pathological conditions. They conclude that lesions are not to be considered degenerative and irrevers-

ible unless they involve the fundamental structure of the liver cell, particularly of its nucleus.

They believe that correlation of the functional and histological findings is of the greatest value, and that though the functional test and the histological examination are quite different, the one being chiefly quantitative and the other qualitative, they supplement each other in revealing the degree and nature of even the mildest liver affections.

AUDREY GOSS MORGAN, M.D.

MISCELLANEOUS

Wilmoth C. L. Persistent Urachus in the Adult *J. Am. U. Ass.* 1936, 106, 526.

Umbilical fistulas derived from remnants of the urachus are rare, particularly in adults. Of 15,000 patients admitted to the Brady Urological Institute only 3 were found to present this condition. Of 5,840 patients seen at the United States Marine Hospital, Staten Island, during the past five years the condition was found in only 3 and was diagnosed not by cystoscopic examination, but by examination of the fistula and the diagnosis was confirmed by operation. A fourth case was diagnosed by an exploratory operation for a tumor extending from the umbilicus to the pubis, which was found to be a malignant growth with metastases extending over the bladder and invading the adherent omentum.

While normally the urachus descends with the bladder after birth, it sometimes does not descend and the secretion from the epithelial lining or secondary infection of the epithelial structure causes sufficient pressure to produce an opening at the umbilicus with a resulting chronic fistula. In none of the cases reported was there a lumen connecting with the bladder.

The chief complaint in the benign cases is an intermittent discharge from the umbilicus. The age of the patient when the discharge is first noted, the onset of the symptoms and the treatment are nearly the same as in cases of ordinary pilonidal cyst, the condition differing from the latter only in its embryological structure and its location. As in pilonidal cyst incision into the infected cyst does not result in cure, but may be necessary as a preliminary operation to establish drainage until the acute infection subsides to the minimum. In the author's cases the entire urachus was removed together with the protruding apex of the bladder and the latter was closed with interrupted sutures. The fourth case shows that malignancy may occur in the persistent urachus.

HARRY W. FISK, M.D.

GYNECOLOGY

UTERUS

Counseller, V S., and Herrell, W E. Some Changing Concepts Regarding the Endometrium and Their Significance *J Indiana State M Ass*, 1936, 29 87

Menorrhagia, metrorrhagia, and amenorrhea have always been difficult problems in diagnosis and treatment. There probably are no other physiological disorders which have been treated more diversely than these disturbances of menstrual function, and up until the present time there has been little, if any, improvement in their treatment. The failure of treatment is due to the fact that the factors producing the disturbance have not been well understood.

Menstruation is a continuous physiological process consisting of loss, regeneration, and differentiation of tissue. Loss of tissue is complete in about twenty-four hours. In the following forty-eight hours, cell migration and reorganization occur. In the next fourteen days there is a process of proliferation which the authors believe is under follicular control. In the next fourteen days there is a differentiative process under the control of the corpus luteum. Both the proliferative and differentiative processes are divided into an early and late phase, in each of which definite changes occur in the glands, epithelium, and stroma. These changes are strikingly characteristic and therefore easily identified.

The authors believe that by the use of this classification of the normal regenerative cyclic process the physiological status of the ovary can be estimated accurately and a more logical course of treatment can be given in cases of abnormal function. Reports of clinical cases support this hypothesis.

Leroux, R., and Millot, J. L. Note on the Uterine Epitheliomas of the Cervical Canal (Note sur les épithéliomas utérins du canal cervical) *Ann d anal path*, 1936, 14 65

Between October, 1921, and December, 1934, the authors observed 1,511 uterine cancers, of which 84 (5 per cent) were of endocervical origin. They report the findings of a histological study of the latter. They call attention to the fact that the cervico-uterine canal is a zone of transition from both the embryological and the histological point of view, and that this fact is of importance in the normal and pathological variations in this region and especially in the polymorphism of tumors at this site.

The 84 endocervical cancers reviewed are divided into 4 broad histological groups and the descriptions of the lesions are supplemented by photomicrographs. As many of the growths were mixed, the grouping is based on the predominant aspect.

The first group included all cancers in which the predominant cell was cylindrical or columnar. These are subdivided into vegetative lesions, canalicular lesions, and lesions without a definite structure. The vegetative variety arises superficially and has a papillary structure. The cells are not secretory. They have basally situated nuclei. If the lesion invades the adjacent muscle it may assume an epidermoid appearance. The canalicular or alveolar variety presents numerous more or less regular cavities lined by a cylindrocolumnar epithelium often possessing secretory properties. Products of secretion may fill the lumina, and there may be metaplastic squamous elements. The cylindrical epitheliomas without a definite structure present numerous solid cell masses or lobules made up of cylindrocolumnar epithelium arranged in a dissociated stroma. They resemble endocrine tissue.

The cancers of the second group are termed "malpighian" (i.e., epidermoid or squamous) cancers. They differ from squamous cancers arising from the exterior of the cervix. The malpighian cells surround or invest the glands, which retain their shape. The cylindrocolumnar layer persists. Products of secretion may be within the glands.

Cancers of the third group are termed "undifferentiated" cancers. They are made up of irregular masses of cells varying markedly, which are often small and basophilic and which show a reduced amount of protoplasm and central nuclei. These cells are midway between the malpighian and the cylindrical cells, and manifest both epidermoid and mucoparous potentialities.

The fourth group of cancers includes complex epitheliomas in which a glandular neoplasm borders an epidermoid cancer, being sometimes superficial to it and sometimes beneath it.

The stromal reactions encountered are similar to those seen in cases of exocervical cancer. Lymphocytes and plasma cells are observed most frequently, and polymorphonuclear cells less often. The latter are usually associated with invasion, the stroma being then very necrotic. Sometimes the stroma is very dense, a veritable scirrhus. Macrophages and giant cells have also been observed.

From the point of view of irradiation therapy the authors believe that cancers of the cylindrical cell type have a no more unfavorable prognosis than others.

Clinically, the authors were unable to differentiate between cylindrical cell and squamous cell growths. They believe that these endocervical tumors are of slow local evolution and rarely metastasize early. They compare their tendency toward surface vegetation to that of corpus cancers. The usual directions of extension are (1) toward the external os, which

makes the lesions clinically simulate cancers of exocervical origin and (2) ascending toward the internal os and the bases of the broad ligaments in which event the cervix may seem almost normal externally even when invasion of the parametria has occurred

In summarizing the authors state that cancers of the cervical canal are frequently confused with cancers arising from the exocervix but have a definite evolutionary and histological individuality. They are characterized by polymorphism based on metaplasia which makes it possible for them to contain all varieties of cells from epithelial to squamous. Their long local evolution simulates that of corpus cancer and like the latter they have a relatively favorable prognosis

DANIEL G. MORTON M.D.

Desmarest and Rellier. Conservation of the Tubes and Ovaries in the Surgical Treatment of Fibromas of the Uterus (*De la conservation des trompes et des ovaires dans le traitement chirurgical des fibromes utérins*) *Gynec et obst* 1936 33 5

The authors condemn the mutilating surgery of the era just passed in which the ovaries and tubes were removed in all operations for uterine fibromas. They state that their removal is usually unnecessary as in the great majority of cases they are normal. Moreover it produces an artificial menopause which has serious physical and psychic consequences. Surgeons have argued that if the ovaries are not removed they will undergo cystic degeneration necessitating another operation but the authors state that they do not become cystic unless they are deprived of their blood and nerve supply and this does not occur if the tubes are left in place.

The operation performed by the authors is very simple. The tubes are detached from the uterus and the uterus is resected just above the isthmus or as far above as the localization and extent of the fibroids will permit. If possible some secreting uterine mucous membrane is left so that a slight menstrual discharge will continue. The tubes are then reattached to the remaining part of the uterus the wound is covered with peritoneum and the abdomen is closed. This operation is not new. It was described by Kelly. The steps in the procedure are shown by illustrations.

The authors have performed this operation in eighty five cases. The only death was due to thrombosis of the trunk of the pulmonary artery. Of fifty six patients who were operated upon several years ago forty five (80 per cent) are now in excellent health. The other eleven show slight signs of the artificial menopause but these are not nearly so marked as those ordinarily shown by women who have been castrated.

AUDREY GOSS MORTON M.D.

Gellhorn G. Primary Squamous Cell Carcinoma in the Body of the Uterus *Am J Obst & Gynec* 1936 31 372

Gellhorn reports two cases of primary squamous cell carcinoma in the body of the uterus. He states

that squamous cell cancer cannot develop directly from the cylindrical epithelium of the endometrium. There must first occur a change from cylindrical into pavement epithelium. This metaplasia may be the result of certain conditions acquired during the lifetime of the individual or due to faulty embryonic development. Both of these etiological factors are discussed briefly. Squamous cell carcinoma of the body of the uterus should be treated by operation rather than by irradiation.

EDWARD L. CORNELL M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Charache H. Primary Carcinoma of the Fallopian Tubes *Ann Surg* 1936 103 290

In a thorough search of the American and foreign literature on primary carcinoma of the fallopian tubes for the period from 1888 to 1933, Charache found the records of 323 cases. To these he adds 2 cases coming under his own observation. The first case of the condition was reported by Orthmann in 1888.

Primary carcinomas of the fallopian tubes constitute 0.45 per cent of all genital tumors. They occur most frequently at about the menopause, usually between the ages of forty and fifty years, but have been known to develop as early as the eighteenth and as late as the seventy third year. Pelvic inflammation and sterility due to pelvic inflammation are predisposing causes. Such a tumor has been found in a virgin in only 2 cases. One of these is reported by Charache.

The majority of the carcinomas begin as multiple papillary outgrowths of an inflamed mucous membrane. The usual symptoms and signs are a sero-sanguinous discharge, various menstrual disturbances, abdominal pain, a palpable adnexal tumor and negative findings on uterine curettage.

The treatment indicated is the removal of both tubes and ovaries and a panhysterectomy with wide excision of the broad ligaments followed by deep roentgen therapy.

The prognosis is very poor. Only 7 patients survived longer than three years.

ALBERT M. VOLLMER M.D.

EXTERNAL GENITALIA

Hausen E. Extirpation of the Lymph Nodes in Cancer of the Clitoris (*De l'extirpation des ganglions dans le cancer du clitoris*) *Arch franco-belges de chir* 1936 35 1

After reporting a case of carcinoma of the clitoris the author discusses at length the incidence, etiology, symptomatology, evolution, prognosis and treatment of the condition. He emphasizes especially the importance of secondary involvement by metastases to the lymphatics. His operative treatment is based upon eradication of the lymph nodes.

Primary cancer of the clitoris constitutes about 4 per cent of vulvar carcinomas. It is the most

malignant form of vulvar malignancy because of the rich blood and lymph supply which favors the dissemination of metastases to the inguinal and pelvic nodes

The presence of metastases in the lymph nodes has no relationship to the age of the cancer nor to the extent of the involvement. Invasion may occur late or early. Clinical determination of the presence or absence of lymph node involvement is difficult if not impossible. Histological examination alone will decide this question.

For these reasons, carcinoma of the clitoris, like breast cancer, requires early radical operation with methodical and complete removal of the lymphatics. The operation includes two steps: (1) removal of the lymph nodes, and (2) removal of the tumor. Both procedures are preferably carried out at one time if the condition and age of the patient will permit. The author begins his operation by removing the superficial and deep inguinal and the external iliac lymph nodes. If the femoral vein is invaded or if the neoplasm cannot be dissected away from it, the vein is sacrificed. Hausen does not fear gangrene of the leg as the femoral vein has abundant anastomoses. Severing the femoral vein provides better access to and facilitates removal of, the retrocrural nodes. The glands, fat, and neoplasm are removed in a single block.

If circumstances permit, the excision is followed by postoperative irradiation as this considerably increases the incidence of permanent cure.

HAROLD C. MACK, M.D.

MISCELLANEOUS

Rubin, I. C. Subphrenic Collection of Lipiodol Following Injection into the Fallopian Tube, with Observations on Reverse Gravitation of Pelvic Exudates and the Genitophrenic Syndrome in Women. *Am J Obst & Gynec* 1936, 31: 230.

The data accumulated so far indicate that lesions in the pelvis are capable of producing pain in the upper abdomen and areas above, especially the shoulder girdle. Large extravasations such as occur in ruptured tubal pregnancy cause pain in the diaphragmatic areas by sudden impact or shock upon the terminal nerves of the diaphragm and by producing marked displacement of the liver. In such cases the blood may occupy, for the most part, the pelvis, the hypogastric fossa, the lumbar gutters, and the subphrenic spaces. Small extravasations may extend up along one or both paracolic fossa to the diaphragm where pain may be elicited by a similar type of irritation. The nerve terminals of the diaphragm appear to be exceedingly sensitive to the presence of foreign bodies, including gas and air. Infective fluids may be assumed to be at least as irritating and may reach the upper abdomen from the pelvis in the same way as blood or gas. As has been demonstrated by lipiodol in quantities of 15 cc. and less, the amount of exudate need not be

large. The recumbent posture is sufficient to allow the fluid to gravitate.

The symptoms produced by the reverse gravitation of infective fluids are pain in the right or the left subcostal space or both and are frequently referred to the gall bladder and the shoulders. The right half of the diaphragm appears to be more sensitive than the left half, and, as has been observed in thousands of tubal insufflations, pain referred to the right shoulder is more severe under identical conditions than pain referred to the left shoulder.

EDWARD L. CORNFELL, M.D.

Wittenbourg, W., and Porkhovnik, J. The Treatment of Functional Disturbances of Menstruation in Young Women with Small Doses of Roentgen Rays Applied Over the Ovaries and the Hypophysis. One Hundred and Seventy-Five Cases. (*Traitement des troubles fonctionnels de la menstruation des jeunes femmes par de faibles doses de rayons X appliqués sur les ovaires et l'hypophyse*, 175 cas) *Reu franç de gynéc et d'obst*, 1935, 30: 1003.

Because of the varied manifestations of menstrual disturbances, an exact classification of such disorders is difficult. In this article the authors consider separately both quantitative and qualitative disorders as well as primary and secondary amenorrhea. They describe the roentgen technique employed in detail, and discuss the rationale for its use. The latter is not easily explained as there is still considerable discussion as to the effect of small doses of roentgen rays on the ovaries and the hypophysis. However, the authors present both experimental and clinical data in support of their contentions.

Menstrual disorders in women under the age of thirty-five years present a varied picture. The disturbances may be qualitative (cyclic) or quantitative (hypomenorrhea, hypermenorrhea). In many cases both types are present. Irradiation of the ovaries with small doses of roentgen rays is almost specific as it acts on the cause by correcting the abnormal function of the ovaries. This curative effect is augmented by irradiation over the hypophysis. The results obtained by such therapy depend to a certain extent upon the type of the dysfunction. Cyclic disturbances with or without hypomenorrhea yield most readily. Amenorrheas are more refractory. The prognosis depends to a large extent also on the patient's age. In cases of amenorrhea after the age of thirty years it is generally doubtful. The time that has elapsed since the onset of the affection and the beginning of treatment is likewise important. The greater the hypoplasia of the uterus the smaller the chance of a good effect from radiotherapy. Following the return of normal menstrual function such abnormalities as virilism, hypertrichosis, and obesity often disappear. In from 15 to 18 per cent of the authors' cases pregnancy has ensued in spite of the fact that the patients were previously sterile. The occurrence of pregnancy probably depends to a

large extent on the return to normal of the hypoplastic uterus. In the reviewed cases the subsequent development of the children was normal and the incidence of deformities was no greater than in any similar group of normal pregnancies.

In conclusion the authors warn of the possible dangers of such treatment by those that are not experienced radiologists and gynecologists.

NATHAN A. WOMACK, M.D.

Berutti E. A Clinico-statistical Contribution for the First Two Years of the Center for the Diagnosis and Treatment of Sterility. (Contributo clinico-statistico del primo biennio di attività del Centro per la diagnosi e la cura della sterilità.) *Ginecologia* 1935 1: 1235-1294.

During the first two years at the Center for the Diagnosis and Cure of Sterility in Milan 427 patients were registered. Four hundred and ten (96 per cent) were married and 17 were marriageable. In 204 cases (63 per cent) the sterility was classified as primary, in 121 (28.3 per cent) as secondary (1 or more previous pregnancies) and in 12 (3.6 per cent) as uncertain primary (history of gynecological metrorrhagia questionable pregnancy).

The criterion for sterility was failure of conception for three years after marriage. A survey of the histories of the 427 patients with primary sterility revealed that 30 had been subjected to a laparotomy for the correction of a uterine displacement, salpingectomy, or the removal of ovarian cysts; 26 had had an appendectomy, and 34 had had a gynecological operation by the vaginal route. Thirty-three (11 per cent) gave histories of medical complications such as pleurisy and diabetes. Of 106 with disturbances of menstrual function, 50 (47 per cent) had amenorrhea or hypomenorrhea and 54 (50.9 per cent) dysmenorrhea. Hypoplasia of the uterus was found in 30 cases, retrodisplacement in 25, and a history or evidence of metritis, endometritis, adnexitis, or Douglasitis in 37.

Of the 121 patients with secondary sterility, 53 had had one or more intra-uterine abortions. In the cases of 10 of the latter the abortions had been followed by dilatation and curettage, while in the cases of 34 no post-abortion operation had been performed. Twenty-two of the patients gave a history of surgical interventions and 53 gave a history or showed evidence of utero-adnexal or peritoneal infection.

Salpingographic studies were made in the cases of 92 patients—64 with primary sterility, 25 with secondary sterility, and 3 with uncertain primary sterility. Of the 64 with primary sterility, 2 (3.4 per cent) were found to have patent tubes, 3 showed little or retarded peritoneal diffusion of the contrast medium, and 35 (54.6 per cent) had impervious tubes. Of the 25 with secondary sterility, 5 were found to have patent tubes, 7 showed delayed peritoneal dispersion of the contrast medium, and 13 (52 per cent) had impervious tubes. Of the 3 with uncertain primary sterility, all were found to have pervious tubes.

Studies of the semen of the husband were carried out in 123 cases. In 84 (68 per cent) the semen was normal in 17 (20 per cent) azoospermia was found, in 17 the number and motility of the spermatozoa were decreased, and in 1 case the man had normal spermatozoa but was impotent.

The treatment varied with the conditions present. Many (not specified) of the women were given glandular therapy, 42 were treated by exocervical diathermocoagulation, and 24 were treated by endocervical diathermocoagulation. Repeated short-wave and diathermy therapy were employed in a large number of cases. Artificial insemination was done in 8. Strassman's operation on the tubes was performed in 1 case, ovariectomy for cystic ovaries was done in 2 cases, dilatation and intubation for cervical stenosis were carried out in 17 cases, and curettage was done in 1 case.

Three of the 17 women treated by cervical intubation became pregnant and were delivered at term. Of those subjected to salpingography, 5 became pregnant from one to three months after the procedure and went to term. One woman treated with extract of the anterior lobe of the pituitary gland, thyroid, and folliculin became pregnant and was delivered at term. Four women became pregnant following exocervical diathermocoagulation and 5 after endocervical diathermocoagulation.

The author believes that prophylaxis against all infections is the most valuable form of treatment in sterility. He advocates educational campaigns against gonorrhea similar to the present cancer and tuberculosis campaigns, more rigid laws against criminal abortion, and thorough eradication of gonorrheal infections in the male.

GEORGE C. FINOLA, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Terplan, K. L., and Invert, C. T. Fatal Hemoglobinuria with Uremia from Quinine in Early Pregnancy. *J Am M Ass*, 1936, 106 529

It is not generally known that quinine, when employed in early pregnancy, may produce hemoglobinemia with severe kidney damage. The authors report a case of fatal quinine poisoning in a forty one year old multipara approximately three months pregnant. Hemoglobinuria and uremia developed. The urea nitrogen of the blood reached 344 mgm per 100 ccm. The patient had been given by a lay abortionist what was estimated to be 100 gr. of quinine as part of the treatment administered to interrupt the pregnancy in its early stages. The onset of the symptoms following the ingestion of the drug could not be determined as the patient did not enter the hospital until her condition became critical. She lived only six days after her admission. During the final days of life the urine became loaded with red blood cells.

The salient changes found at autopsy were hemoglobinuric infarcts in both kidneys, a diffuse glomerulonephritis, distinct uremic gastritis and enterocolitis with strong ammoniacal odor, edema of the liver with slight brownish discoloration (hemosiderosis), severe anemia of the entire integument with a marked peculiar grayish hue, a purpuric rash on the back and sacral region, and remnants of necrotic placenta in the uterus. There were no signs of endometritis. Chemical analysis of the liver showed it to contain 3 gr. of quinine.

HARRY W. FINE, M.D.

Pugh, W. S. Tuberculosis of the Kidney in Pregnancy. *J Urol*, 1936, 35 160

In tuberculosis of the kidney, pregnancy is more than likely, as a result of increased physiological activity, to light up an old focus of disease.

There are no typical symptoms of tuberculosis of the kidney in pregnancy. The symptomatic peculiarities of the condition are due largely to the changes in the urinary passages taking place during gestation. In the majority of cases the first symptom is pollakiuria, usually of the painful type, which persists both during the day and at night. Pyuria is so often associated with other diseases that it is of little diagnostic aid. Hematuria is fairly frequent and often one of the first signs noted, but must be distinguished from the hemorrhages of the bladder and urethra occurring so frequently in pregnancy. Fever is an important symptom and is particularly high, often reaching 40 degrees C.

The author states that in his experience small amounts of albumin in the urine were not signifi-

cant. A clear sterile urine is far more suggestive. Tubercle bacilli are found in about half the cases.

The physical examination should include a study of the vagina and palpation of the ureters. If definite ureteral rigidity is found, the condition is quite certain to be tuberculosis. Ureteral catheterization and pyelography yield certain definite indications and are not contra indicated at any stage of pregnancy. Bilateral pyelography is less harmful than failure to employ it. If careful urinalysis does not demonstrate the tubercle bacillus, inoculation of a guinea pig will usually confirm or disprove the diagnosis. A typical pyelogram in renal tuberculosis cannot be described, but the roentgen demonstration of ureteral rigidity is most certain evidence of renal tuberculosis.

The treatment of choice of unilateral tuberculosis in pregnancy is removal of the kidney. The so-called conservative methods should be reserved for bilateral affections and tuberculosis of a remaining kidney. The beneficial effects of ultraviolet light must not be overlooked in this connection.

As the renal process is acutely exacerbated in practically all cases with obstruction, the author urges immediate intervention. Interruption of the pregnancy not only fails to check the disease process, but is dangerous, particularly in the late months. It should be done only when the patient refuses nephrectomy or an infection of both kidneys is present.

Pregnant women stand the operation well. As the average mortality of the children born of tuberculous mothers is about 60 per cent, early removal of the tuberculous focus appears to be indicated in the interest of the child as well as the mother.

The author regards cases of renal tuberculosis as an important field for contraception.

Five cases in which the woman went to full term and was delivered of an apparently healthy child after nephrectomy are reported. One patient died fifteen months later of abdominal tuberculosis with extensive ulceration of the sigmoid flexure and perforation into the intestinal canal.

In the postoperative treatment physiotherapy is indispensable.

CHARLES BARON, M.D.

LABOR AND ITS COMPLICATIONS

Bittmann, O. Experiences with Rapid Delivery by the Delmas Method, with Critical Remarks on Uterine Innervation and the Justification of Spinal Anesthesia in Obstetrics. (Erfahrungen mit der Schnellentbindung nach Delmas, nebst einigen kritischen Bemerkungen zur Uterusinnervation und zur Berechtigung der Lumbalanästhesie in der Geburtshilfe). *Arch f Gynaek*, 1935, 159 618

Although, on the basis of the findings of previous investigations, opinion regarding the Delmas method

of forced delivery is decidedly unfavorable, the author tried this method in 108 cases. Among the indications were a change in the cardiac sounds of the child, edema of the os uteri, the delivery of old primiparas, weak labor pains, premature rupture of the fetal membranes, eclampsia, placenta previa, and a preceding cesarean section. The gross mortality was 2.7 per cent (3 deaths) and the corrected mortality about 1 per cent (1 death). The maternal morbidity was 8.3 per cent, and the infant mortality 2.7 per cent. In 6 (5.5 per cent) of the cases there were lacerations of the cervix uteri. In 1 of these a case of placenta previa death resulted. On the basis of the favorable weight curves of the newborn the author concludes that the Delmas method, which he characterizes as a 'protective obstetrical procedure' is of considerable advantage also for the child. The only maternal contra-indications to the method recognized by him are old and poorly healed lacerations of the cervix. He believes that even in the cases of women who have been previously subjected to cesarean section the Delmas method is the procedure of choice since in all of 6 such cases except 1 in which uterine amputation was necessary on account of atony its results were good.

(H. FLECHS.) CLARENCE C. REED, M.D.

Sheldon, G. P. A Record of Twenty Six Cases of Rupture of the Uterus. *Am J Obst & Gynec* 1936 31: 455

Of 47,554 deliveries at the Boston Lying In Hospital, rupture of the uterus occurred in 26. Sixty-five per cent of the ruptures resulted from the trauma of an operative delivery through the pelvis. In 12 of 17 cases of traumatic rupture, internal podalic version was the ultimate type of delivery.

Five of 9 spontaneous ruptures followed a previous cesarean section. Multiparity is an important etiological factor. Only 1 of the patients with spontaneous rupture were primi gravidas.

The maternal mortality in the reviewed cases was 42.3 per cent, and the fetal mortality 82 per cent. The treatment of choice is hysterectomy soon after the occurrence of the rupture. Transfusion markedly influences prognosis. FOWARD L. CORNELL, M.D.

PUERPERIUM AND ITS COMPLICATIONS

Peckham, C. H. Statistical Studies on Puerperal Infection. I. Some Factors Influencing the Incidence of Puerperal Infection. *Am J Obst & Gynec* 1936 31: 435

An effort has been made to investigate statistically certain beliefs, most of them well established clinically, concerning the factors which influence the incidence of puerperal infection. It seemed that this could be done best by analyzing a series of cases in which the chance of infection was high, viz., cases on a ward service from the lower social strata with a high incidence of medical and obstetrical abnormalities. The findings of such an analysis were as follows:

The incidence of puerperal infection was almost twice as high in colored patients as in white patients, being 20.24 per cent in the former and 11.05 per cent in the latter.

A definite and steady decline in the infection rate was apparent with advancing age up to the thirtieth year. In the higher age groups a secondary rise occurred, but it was believed that this was due to a higher incidence of complications in these groups.

A similar decline was found associated with increased parity, except in the cases of women who had borne nine or more children. The secondary rise following this decline was also attributed to complications as women of such age and parity would not have been received in the hospital unless some abnormality necessitated their admission. The total incidence of infection was 19.16 per cent in primiparas and 11.61 per cent in multiparas.

The incidence of puerperal fever due to intra-uterine infection was 2½ times as great in cases of operative delivery (30.86 per cent) as in cases of spontaneous delivery (12.26 per cent). Even a perineal tear or episiotomy with immediate repair caused a definite increase. The puerperium was febrile in almost two-thirds of the cases in which manual removal of the placenta was necessary. In general, the risk of puerperal infection in the operative cases seemed to be in direct proportion to the amount of intra-uterine manipulation.

The incidence of puerperal fever increased directly with the duration of labor, and the rate of increase was most rapid when the labor was prolonged. The average length of labor in the cases in which infection developed was three and one-half hours longer than in the cases in which the puerperium was normal.

In the cases of women admitted to the hospital after the failure of attempts at delivery in their homes, the incidence of puerperal infection was 61.54 per cent.

The incidence of puerperal fever was lowest in the cases in which the membranes ruptured spontaneously or were ruptured artificially prior to the onset of labor, but was only 1 per cent higher when rupture occurred during the second stage of labor. The results were most satisfactory when rupture took place during the first stage of labor.

In the presence of most medical and obstetrical abnormalities, the incidence of infection was increased. To a great extent the increase paralleled the high incidence of operative delivery due to the complications. It appears that excessive blood loss either before or after delivery increases the incidence of infection by lowering the general resistance.

The mortality from puerperal infection in the City of Baltimore showed a seasonal variation similar to that shown by the mortality from respiratory diseases, except that the curve of the former followed the curve of the latter by about a month. However, although the figures analyzed covered a series of 25,000 deliveries, no similar seasonal variation was observed in the incidence of puerperal infection. It

is possible that this discrepancy is explained by a seasonal variation in the virulence of the invading bacteria
EDWARD L. CORNELL, M D

MISCELLANEOUS

Garnett, W Y P, and Jacobs, J B Pelvic Inclination *Am J Obst & Gynec*, 1936, 31, 388

The authors investigated the habitual inclination of the pelvis as well as that of the inlet in the recumbent position in a series of living women. Their figures are not in accord with those generally accepted. They emphasize the importance of the obstetrical angle.

The inclinometer and X ray afford absolute knowledge of pelvic inclination. Exaggerated forms are not common, but should be recognized and studied. Several easy methods of noting inclination are described.

The role of inclination in the mechanism of engagement and delivery, the practical value of postural variations in labor, and the proper application of pressure to the overriding head are discussed. A test of labor is urged.

In cases of failure of the head to become engaged because of faulty inclination the use of forceps or version often ends disastrously. Cesarean section should be considered.

Preliminary reference is made to a simple, clear, accurate, and inexpensive method of lateral pelvic roentgenography for study of habitual inclination and for mensuration.

The most favorable inclination noted was 70 degrees in the recumbent position and 20 degrees in the standing position. The most unfavorable inclination was found in the case of a primipara who had had infantile paralysis in childhood. In this case the inclination of the inlet in the recumbent position was 7 degrees, the plane of the inlet being almost continuous with the spinal column. In spite of the poor inclination and the pelvic contraction, the patient's legs were flexed sharply on the abdomen and a baby weighing 6 lbs, 7 oz was delivered normally after a short labor.
EDWARD L. CORNELL, M D

Baird, D Maternal Mortality in the Hospital *Lancet*, 1936, 230, 295

The maternal death rate in the Glasgow Royal Maternity Hospital is falling, partly because of general improvement in technique and partly because the more abnormal cases, which were formerly sent in as emergencies, are now being sent to the hospital before labor begins or in the early stages of labor.

There is room for improvement both within and outside of the hospital. The chief faults within the hospital are (1) the lack of proper organization for immediate blood transfusion in cases of hemorrhage, and (2) the fact that many urgent cases, which present most difficult obstetrical problems, must be dealt with by junior members of the staff because their seniors are non resident. The faults outside of the hospital are the lack of adequate antenatal supervision, particularly in cases of toxemia, and unjustifiable attempts to perform major obstetrical procedures under adverse conditions. The problem outside the hospital is especially difficult because of ignorance and lack of cooperation on the part of the patient. Moreover, in Glasgow, rickets in childhood (which is responsible for a high incidence of contracted pelvis), multiparity, poor housing, and poverty are very important factors. As persons of the class from which the hospital patients come cannot afford even a small fee to a family doctor, an extension of antenatal supervision by the local authority—possibly with compulsory notification of pregnancy—is urgently required. More hospital accommodation, especially for antenatal cases, is also a pressing need.

It is clear that in about 9 per cent of the fatal cases pregnancy was a grave risk which the patient should not have been allowed to assume. Sterilization or contraception was indicated. Experience at the voluntary birth control clinic shows that most of the patients cannot pay the sum necessary for the purchase of contraceptive materials and as there are no birth control clinics under the local authority in Glasgow, this problem should receive immediate attention.
J. THORNWELL WITHERSPOON, M D

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Peretz L H Schapiro J N Chomjenko T A, and Prochoff M P. The Qualitative Differences of Colon Bacilli in Pyelocystitis in Relation to the Protective Action of the Normal Microflora (Ueber die Qualitätsbedeutung der B coli bei Pyelocystitis im Lichte der Lehre von der Schutzrolle der normalen Mikroflora) *Ztschr f urol Chir* 1935 41 262

It is generally believed that the colon bacillus is the most common cause of pyelocystitis. Franke demonstrated that in some cases the bacilli reach the renal pelvis by lymphogenic spread. This is evidenced by the fact that pyelitis of pregnancy is considerably more common on the right side than on the left. Nissle found that different strains of colon bacilli differ qualitatively and possess different antagonistic colon bacillus indices.

The authors undertook to determine the type of the colon bacilli which are active in pyelocystitis and to answer the question whether their entrance from the intestinal tract into the urinary tract has any relationship to the qualitative characteristics of the different strains. Of the seventeen patients whose intestinal bacilli were studied, fifteen had an intestinal disease or abnormality of function such as constipation, rotitis, or chronic appendicitis, and the two who were free from subjective intestinal symptoms showed a similar definite relationship between the intestinal bacilli and the bacilli in the urinary tract.

From their findings the authors conclude that the presence of colon bacilli in the urinary tract is the result of two factors: the constant penetration of the bacilli from the intestinal tract and multiplication of these bacilli in the urinary tract. As evidence of the first they cite the qualitative relationship which they found between the colon bacilli recovered from the urine and the bacilli recovered from the feces of the same patient, and as evidence of the second the identity of the strains recovered from all of the affected parts of the urinary tract. Accordingly, there is a definite relationship between pyelocystitis and the pathological condition in the intestinal canal and between the type of colon bacilli present in the urinary tract and the type of those in the intestinal canal. It was shown also that the intestinal bacilli which were cultured from the urine of patients with pyelitis had distinctive qualitative characteristics, and that the antagonistic colon bacillus index of the feces of these patients was poorer.

The authors conclude from their findings that in cases of pyelocystitis it is necessary to pay special attention to the function of the intestines and the problem of rendering the bacterial flora of the intestines normal. (COLMERS) WILLIAM C BECK, M D

BLADDER, URETHRA, AND PENIS

Knutsson F. Urethrography. Roentgen Examination of the Male Urethra and Prostate After the Injection of Contrast Material into the Urethra. Experience Gained from the Examination of 154 Patients in the Marla Hospital, Stockholm. *Acta radiol* 1935 Supp 28

For injection of the contrast medium for roentgen examination of the male urethra and the prostate the author uses a 20-cm syringe to which a long adaptor with a stopcock is fastened and which is fitted with a rubber urethral tip. A special penis clamp is attached to the adaptor. The contrast solution used in most cases is a 20 per cent solution of iodipin (iodized oil). After a preliminary roentgenogram has been made without use of the contrast medium, about 15 c cm of the contrast solution are injected and a right oblique roentgenogram is taken while the solution is passing the sphincters. Next, a frontal roentgenogram is made with injection of 2 or 3 c cm of the contrast medium during the exposure. A left oblique roentgenogram is made in the same manner. To study the reflex contraction of the pars posterior of the urethra, a fourth roentgenogram is then made while no fluid is being injected. Finally, an almost lateral roentgenogram is made during the injection.

The author discusses the roentgen findings and correlates them with the clinical findings in 154 cases. The conditions studied included inflammations of the urethra and prostate, prostatic hypertrophy, cancer of the prostate, traumatic strictures, tuberculosis, and the condition after prostatectomy.

In the cases of 33 subjects with a normal urethra the contours were normal. The size of the lumen, the length of the pars prostatica, and a clear and pronounced collicular defect were all within certain limits. Filling of the glandular ducts did not occur.

Prostatitis does not give rise to changes in the urethrogram if obvious enlargement of the prostate is not present and if the prostatic ducts have not been converted into rigid canals with open orifices which allow contrast filling from the urethra.

In the study of this condition the author takes great care to locate and examine the bladder orifice. If the bladder is well emptied before the injection of the iodized oil, the rounded bladder shadow is definite and the urethral shadow passes into it at a right angle. When the bladder contains urine, the heavier iodized oil runs into its most dependent portion. This flow of contrast oil within the bladder gives rise to contrast bands in the roentgenograms. The bands extend away from the bladder orifice and have been ascribed erroneously to the urethra. If this fact is borne in mind and the different views are



Fig 1 Normal urethrogram. Left oblique view during and after injection and lateral view. Absolutely smooth contours. Distinct collicular relief. After termination of the injection the pars posterior contracted normally so that only an insignificant amount of contrast medium remained on the mucous membrane and only a small drop of oil was left at the bladder orifice. Because of the contraction, the bulbomembranous junction can be localized exactly. In the lateral view the pars posterior presents a slightly arched course and passes over at a right angle into the bladder shadow.

studied, the situation of the orifice can be definitely established.

Urethrovascular reflux was observed in 4 of the reviewed cases. The author distinguishes between urethrovenous reflux previously described in the literature and urethrocavernous reflux. The latter consists of contrast filling of the venous spaces in the corpus cavernosum of the urethra.

Fig 2 shows a distinct boundary between the contrast-filled urethra and the contrast-filled corpus cavernosum, which is visible as a lighter zone. The



Fig 2

dotted line indicates the position of the urethral wall. At the beginning of the examination a well defined fleck of contrast medium was seen in the pelvis minor. This is indicated by the arrow in the upper part of the picture. Toward the end of the examination the fleck had disappeared. Apparently it had



Fig 3 Right oblique view. Patient sixty years of age with a history of gonorrhea at the age of twenty-five. Clinical diagnosis: urethral stricture with fistula and perineal phlegmon. Diffuse narrowing within the entire pars anterior. Several valvular strictures. The pars bulposa contains a cylindrical stricture from 3 to 4 cm. long and with uneven walls. From it extends a perineal fistula. The collicular relief is present.



Fig 4 Right oblique frontal left oblique and lateral views in a case of fibro adenomatous prostatic hypertrophy

been in a larger pelvic vein. The examination was followed by chills and fever.

Among the cases reviewed there were 75 of inflammatory changes in the urethra and prostate. Strictures were found in 65. In 52 there was a history of gonorrhea.

Valvular strictures were found in 28 cases and cylindrical strictures in 48 cases. The cylindrical strictures usually occur in the pars bulbosa and are single. Valvular strictures may occur anywhere in the urethra and are usually multiple. Chronic prostatitis evidenced by filling of the duct system in the prostate was found in 26 cases. The para-urethral ducts were filled in 23 cases and external fistulae in 6 cases.

Tuberculosis of the urethra and prostate was found in 4 cases. A characteristic destructive tendency, with an ulcerous or cavernous breakdown was noted. As instrumental examination is usually impossible the importance of increased roentgen experience in the diagnosis of tuberculosis is obvious.

In none of the cases of prostatic hypertrophy was the urethrogram normal. The pars prostatica showed deviations in its length, course, width, relief, and motility. Prostatic hypertrophy brings about a characteristic elongation of the supracollicular portion of the urethra. The prostatic curve may be increased, and lateral views often show a widening of the prostatic urethra due to the formation of a sagittal cleft by the hypertrophied lateral lobes.

Cancer of the prostate was found in 5 of the cases studied. The changes in the urethrogram produced by prostatic cancer involve the entire pars prostatica and thus differ from those in prostatic hypertrophy which affects only the supracollicular portion. A characteristic change is a general narrowing of the lumen due apparently to cancerous infiltration of the urethral wall.

The roentgen findings after prostatectomy in 13 cases are described.

The article contains also pathological descriptions of importance for interpretation of the roentgenograms.

THEOPHIL P. GRAUER, M.D.

GENITAL ORGANS

Morson, A. G. Prostatectomy. *Brit. Med. J.* 1936, 1, 195.

The author reviews the three stages in the development of the technique for prostatectomy. He discusses first the Freyer technique, next the Thomson-Walker technique, and finally, the Harris technique. He states that the Freyer and Thomson-Walker procedures are to be condemned as they are unclear and non-surgical and result in multiple complications including a post-trigonal pouch and postoperative urethral obstructions. In the Harris technique the posterior prostatic pouch is completely obliterated and hemorrhage is controlled nearly completely by the method of suturing the posterior bed by which

complete closure of the bladder without suprapubic drainage is accomplished

Morson reports that approximately 50 per cent of his cases have drained suprapubically. He contends that following prostatectomy there is very slow healing of scar tissue in the prostatic bed and that, however soon the suprapubic wound closes, the patient must be considered in the convalescent stage for at least two months. When the Harris technique is employed postoperative recurrence of obstruction is prevented. Harris attempts to obtain primary healing after all of his prostatectomies.

In describing some new instruments, Morson advocates the use of an intraprostatic retractor for hemostasis and more accurate suturing of the trigonal edge to the remnant of the urethra which he alludes to as "retrigonization." He objects to the introduction of the finger into the rectum practiced by Harris as he believes it favors infection. For the prevention of epididymitis and seminal vesiculitis, he recommends vasoligation with the injection of a 1:60 solution of carbolic acid through the proximal end of the divided vas into the seminal vesicles. For the prevention of hemorrhage and for better approximation of the edge of the mucous membrane he suggests a figure of eight suture across the roof of the internal sphincter.

In conclusion he says that those who have been in active practice from the days of Freyer's successful campaign for complete prostatectomy are best able to appreciate that progress that has been made in increasing the comfort of the patient convalescing from removal of the prostate. Prior to the Great War such a patient was exhausted by a steady loss of blood, sepsis within and outside of the bladder, and loss of sleep due to discomfort produced by wet dressings or the Irving box with its tight straps. Then came the era of the Thomson-Walker technique. In this era infection was reduced and hemorrhage better controlled, but the patient with a large suprapubic tube draining bloody urine was obliged to struggle to overcome his disabilities. Today, primary closure having proved successful, the patient recovering from prostatectomy is comparatively comfortable. J. SYDNEY RITTER, M.D.

Pinelli, L., and Guglielmi, G. Bone Metastases from a Seminoma of an Abdominally Retained Testicle (Carcinoma ossea metastatica da seminoma testicolare ritenuto nella cavità addominale). *Chir. d'organi e movimento*, 1935, 21: 351.

This is a clinical and autopsy report of a seminoma of an abdominally retained testicle in a bilaterally cryptorchid individual twenty six years old, which metastasized to the lumbar vertebrae, ileum, and ribs. At nine years of age the patient was operated on for a left inguinal hernia with inguinal ectopia of the testicle. The latter was left *in situ*, and at autopsy was not remarkable except for atrophy. The first symptom was left sided sciatic pain. This was followed in a few weeks by the appearance of a tumor in the lower right abdominal quadrant. In

spite of negative roentgenograms at first, a diagnosis of vertebral metastases was made on the basis of marked rigidity of the dorsolumbar spine with root symptoms. The authors discuss briefly the reasons for the late appearance of X ray signs in the vertebrae. The root symptoms were probably due in their early stages to inflammatory irritation rather than external pressure. The bone changes were exclusively osteoclastic.

From their study of the literature the authors concluded that, with the possible exception of an incomplete observation by Zagni, this was the first case of seminoma with bone metastases to be reported. However, while their article was in press Giordani's report of three similar cases appeared in the *Bollettino delle scienze mediche*, Bologna, 1935, No. 2.

The article is accompanied by roentgenograms, photographs, and an Italian, French, and German bibliography. M. E. MORSE, M.D.

Stengel, A., Jr. Mumps Orchitis. *Am. J. M. Sc.*, 1936, 191: 340.

The author reviews the history and discusses the etiology and pathogenesis of mumps. In calling attention to the relationship between the parotid gland and the testicle, he states that orchitis usually follows parotitis. Orchitis due to parotitis is more often unilateral than bilateral and occurs most frequently at about the age of puberty. Its symptoms are variable, but include fever and testicular swelling, tenderness, and pain. The fever subsides by lysis. The complications include central nervous system involvement, atrophy of the testicle in from 40 to 60 per cent of the cases, impotence, and sterility. The pathological change is considered a parenchymatous sclerosis. The treatment is prophylactic and symptomatic. Some cases have been treated by surgery and others with convalescent serum. DONALD K. HARRIS, M.D.

Warthen, H. J. and Williams, P. True Hermaphroditism. *Ann. Surg.*, 1936, 103: 402.

The term "true hermaphroditism" or "glandular hermaphroditism" is applied correctly only to the condition of individuals with both male and female gonads. This condition is of the following three types:

1. Hermaphroditism bilateralis. A testis and ovary are present on both sides and may be united into an ovotestis.

2. Hermaphroditismus unilateralis. A testis and an ovary are present on one side and either a testis or an ovary is present on the other side.

3. Hermaphroditismus alternans. A testis is present on one side and an ovary on the other.

Physiological hermaphroditism with functioning of the organs of both sexes does not occur in vertebrates.

The authors report a case of true anatomical bilateral hermaphroditism associated with a huge congenital inguinal hernia. Bilateral ovotestes,

fallopian tubes, a uterus, epididymides and a prostate were present ANDREW McNALLY MD

MISCELLANEOUS

Cumming R E and Chittenden G E. Intra venous and Retrograde Urography *J Am M Ass* 1936 106 602

To determine the value of intravenous urography as compared with cystoscopic (retrograde) urography from the standpoint of roentgenologists urologists and pathologists, the authors sent out 350 questionnaires

They state that the variety of answers received makes one waver between the adoption of intravenous urography to the exclusion of the retrograde method and the adoption of the retrograde method to the exclusion of the intravenous method. In their own practice they have found a need for both methods as in cases of renal tuberculosis and of large hydronephrotic kidneys the information yielded by the intravenous method is rarely satisfactory.

According to the replies to the questionnaire the major indications for intravenous urography are

1 Bilateral functional dynamic and anatomical studies

2 Informative studies in (a) injuries to the kidneys, ureters bladder and urethra (b) calculus (c) nephroptosis (d) perirenal abscess (e) congenital defects and anomalies (f) obstructive lesions at any site (g) ureteral transplantation (h) the differential diagnosis of urological from abdominal conditions (i) urinary tract tuberculosis (j) hydronephrosis and (k) the pyelonephritis of pregnancy

3 The avoidance of cystoscopy because of (a) difficulty or impossibility of cystoscopy because of urethral or ureteral obstructions (b) pain or (c) severe infection

4 Routine studies in prostatic hypertrophy

5 Urological conditions in children

The minor advantages of intravenous urography are its value in study preliminary to cystoscopy, the comparative simplicity of its technique, the clearness of the kidney outlines, the avoidance of deformities due to spasm or excessive pressure, the relatively low cost of the examination, if cystoscopy is not necessary, the avoidance of hospitalization, applicability of the method in the cases of neurotics, patients who refuse cystoscopy and pulmonary tuberculosis and the value of the procedure for supplementary or confirmatory information and for follow up medical or postoperative study

Its major disadvantages are

1 Insufficient diagnostic information because of (a) insufficient filling of the calyces or pelvis (b) too rapid elimination (c) complete absence of a shadow

when the kidney is normal and (d) incomplete information regarding the ureters and bladder

2 The lack of cultural information

3 The possibility that intestinal flatus may render the urograms misleading

4 Lack of detail in the cases of obese persons

5 The necessity for considerable experience for interpretation of the urograms

Its minor disadvantages are

1 Technical difficulties (poor veins and other conditions)

2 Its indiscriminate use and use by incompetent men

3 Its cost if retrograde urograms are necessary

The contra indications to intravenous urography are

Renal (1) low renal function, (2) nephritis (3) high nitrogen retention (4) nephrosclerosis, and (5) nephrosis

Hepatic (1) hepatic insufficiency, (2) hepatic cirrhosis

3 Cardiovascular (1) coronary disease (2) advanced myocarditis and (3) decompensated cardiac conditions

4 Miscellaneous (1) hyperthyroidism (2) pulmonary tuberculosis (3) allergic states and (4) by pyrexia

Although 5 fatal reactions were reported the authors find it difficult to attribute them to the standard mediums. In 164 cases there were no reactions. The most common reactions to the newer preparations were allergic reactions (urticaria 2, cases rhinitis 5 cases edema of the glottis, 5 cases an unspecified reaction 5 cases facbrymation 3 cases 'iodism' 3 cases a nitritoid reaction 2 cases and salivation 1 case) thrombosis (0.3 per cent of 5,000 cases—Braasch) pain, 8 cases, nausea and vomiting 7 cases cellulitis, 3 cases syncope, shock and collapse 7 cases, temporary anuria 2 cases and 'nervous reactions,' 2 cases

Pyeloscopy in conjunction with intravenous urography was reported to give sufficiently clear and dense images. The authors believe that much valuable information may be obtained by making one or more roentgenograms in a lateral or semi-oblique position in routine studies of the upper urinary tract

They conclude that it is necessary to take advantage of both methods of urography and to make serial or multiple exposures at carefully chosen intervals. They emphasize that the roentgenologist and urologist should work together. They believe that intravenous urography has a definite rôle in the study of the urinary tract although it is probable that the ideal medium and technique are still to be worked out

LOUIS NEWELL MD

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC

Gurd, F B Post-Traumatic Acute Bone Atrophy
A Clinical Entity *Arch Surg*, 1936, 32 273

The author believes that the importance of acute bone atrophy as a cause of prolonged disability is not sufficiently well recognized by the majority of surgeons. It is his opinion that the easily identified osteoporotic lesion in the bone is accompanied by atrophic changes in the ligaments, their attachments, and the cartilage covering the ends of the bones in the articulations, and that these changes should receive special attention in efforts to solve the problems of cause, prevention, and cure of acute bone atrophy.

Gurd reports twenty-four cases. Nineteen of the patients were males. In fifteen cases the lesion occurred in the foot, in six, in the hand, in two, in the shoulder, and in one in both the foot and the ankle. The original trauma was usually comparatively trivial, but in almost all of the cases there was a history of prolonged or repeated injury to the traumatized tissues. Delayed or inadequate immobilization contributed to the development of the condition. An analysis of the cases was attempted to determine the cause of the lesion. There appears to be no endocrine disturbance or pathological or unstable condition of the nervous system or the general circulatory system. The author believes that the bone absorption is due to hyperemia apparently resulting from nerve stimuli transmitted from the traumatized tissues through the spinal ganglia.

Acute bone atrophy presents typical signs and symptoms. Comparatively soon after an injury the extremity rather suddenly becomes swollen and extremely painful, particularly on movement, and the joints become stiff. The skin loses its normal markings and becomes glazed and dusky red. Blood vessels may be palpated, and it is apparent that the capillaries are engorged and an increase in interstitial tension has taken place. Roentgenograms taken within a few days after the onset show patchy areas of almost complete decalcification of bones, which are most marked in the small bones of the carpus or tarsus, the ends of the metatarsal and metacarpal bones, and the phalanges, but may be found also in the lower ends of the leg or forearm bones. In the shoulder, the osteoporotic process is present in both the scapula and the humerus. As the lesion progresses the rarefaction becomes more marked until it is evident in the shafts of the long bones. This is the chronic second stage.

In the treatment, pain should be prevented and forcible manipulation avoided. Relief from pain is obtained by absolute rest, and the swelling is reduced

by prolonged elevation. For treatment of the upper extremity, the application of a snugly fitting unpadded plaster cast and physical therapy, especially diathermy and hot baths, are recommended. In the case of the lower extremity, the application of an unpadded walking plaster cast with a felt heel after absolutely all interstitial edema has been relieved is the method of choice. Care must be taken to remodel the foot to prevent flattening. Six months or longer is required to bring about a clinical cure. Sympathectomy was attempted in only one case and yielded unsatisfactory results.

RUDOLPH S REICH, M D

Valls, J., Ottolenghi, C., and González, J. C. L.
Fibrous Osteitis and Hyperparathyroidism. A Study Based on Two Cases Treated Surgically (Ostitis fibrosa e hiperparatiroidismo. A propósito de dos casos operados). *Rev de ortop y traumatol*, 1935, 5 91

The authors report two cases of fibrous osteitis or Recklinghausen's disease which they believe show beyond doubt that the disease is caused by hyperfunction of the parathyroids. They present the roentgenograms, show the histological findings by photomicrographs, and review cases previously reported by others.

The authors' first case was that of a woman twenty-two years of age in whom the first manifestation of the disease was a pathological fracture of the femur occurring February 15, 1930. In spite of roentgen irradiation, treatment with hormones and vitamins, and ligation of the inferior thyroid arteries, the condition continued to progress. The changes in the bones were so striking that when the parathyroids were removed in December 1933, the bones were almost transparent to the roentgen rays. By that time the patient had suffered many pathological fractures, the bones were of the consistency of rubber, and she was seriously deformed. She suffered also from attacks of abdominal pain, frequent vomiting, attacks of suffocation, and a tachycardia of from 130 to 140 beats per minute. The calcium content of the blood and urine was increased. In spite of her poor general condition, she withstood the operation well. After the operation, however, she developed severe tetany.

The operative specimen showed a parathyroid adenoma. Under calcium treatment the patient recovered from the tetany, the blood calcium returned to normal, and the other symptoms of hyperparathyroidism were overcome. Roentgen examination a year and a half after the operation showed restoration of the normal bone structure and a marked increase in the calcium in the bones. The deformities, of course, persisted. Recently

another slight rise in the blood calcium has been noted and it is not known whether this will be followed by a recurrence of the disease such as developed in a case reported by Mandl

The authors' second case was that of a man forty eight years old who had had the disease for three years but was in a much less serious condition than the first patient. In this case the first manifestation of the condition was pain in the right arm, which was followed by a pathological fracture of the humerus on the same side. The symptoms slowly increased. When the patient was first seen by the authors roentgen examination of the bones showed decalcification and examination of the blood revealed a marked increase in calcium and an eosinophilia of 9.66 per cent. At operation the parathyroids were found enlarged but no signs of adenoma were apparent. The patient recovered completely and after a year is still in good health. After the operation he had only slight signs of parathyroid deficiency which were promptly controlled by calcium treatment.

AUDREY GOSS MORGAN M.D.

Waugh T. R. Hemolytic Anemia in Carcinoma of the Bone Marrow. *Am J W Sc* 1936 191 160

The author discusses the profound blood changes which often occur in persons suffering from malignant tumor. He states that in the vast majority of cases it is possible to arrive at a satisfactory explanation of the hematopoietic disturbance by careful study. He classifies the causes of the disturbance into primary and secondary.

Primary causes play a rôle when the abnormal hematopoietic activity is brought about directly by the cancer cells or their metabolic or excretory products. Among the secondary causes are the disturbances which result from the effect produced by the tumor growth on other parts of the body and hence indirectly on the blood forming organs.

In a great many cases examination of the blood reveals a typical posthemorrhagic anemia. This is the case particularly in cases of tumor of the stomach, large bowel, rectum and uterus. Persistent hemorrhages may occur from growths in these locations. Frequently in cases of carcinoma of the stomach a diagnosis of pernicious anemia is made. In the majority of cases the anemia is simply the result of persistent blood loss. In an occasional case, however, the blood changes are characteristic of pernicious anemia. Whether such cases are to be interpreted as representing extraordinary combinations of the two conditions or whether the carcinoma plays a rôle in the production of the anemia is at present uncertain.

Not infrequently cases showing an increase in the number of erythrocytes above the normal are encountered. Such an increase is found for instance, in cases of carcinoma of the esophagus in which the fluid intake is reduced and anhydremia has resulted. In such cases there is a type of pseudopolycythemia

which may be readily recognized from the very high refraction index of the blood plasma. An increase in the red blood cells is found also in anovemia resulting from tumors of the thorax which interfere with proper aeration of the blood. In cases of such neoplasms a symptomatic polycythemia results and there may be more than 6,000,000 red cells per cubic centimeter.

The leucocytosis which frequently accompanies malignant tumors may be explained on the basis of inflammatory reactions accompanying the tumor growth.

Hemorrhagic diathesis may result from secondary causes in cases of obstruction of the bile ducts with jaundice. Its severity is in direct proportion to the length of time the jaundice has been present.

Many of the anemic states due to the primary causes are often attributed to "cachectic" changes but on more careful analysis this theory is found to be unsatisfactory. The author doubts the occurrence of phagocytosis of the erythrocytes by cancer cells.

It has been recognized for some time that in certain cases of extensive metastases of cancer in the bone marrow profound changes take place in the blood. A large number of nucleated red cells may appear even when the anemia is not severe. In addition myelocytes and myeloblasts may be thrown into the circulation. In fact, these changes have been looked upon by hematologists for some time as suggestive of metastatic carcinoma of bone. They have generally been explained on the basis of irritative effects on the myeloid tissue caused by the presence of the neoplastic cells.

In metastatic carcinoma of bone with anemia, the anemia is of the hyperchromatic type, the color index being high.

The author reports two cases of hemolytic anemia due to primary causes. He is of the opinion that, as the result of extensive carcinomatosis of bone, there may occur a generalized alteration in hematopoietic activity of a nature to lead to the changes necessary for the production of a typical hemolytic anemia. He regards it possible also that the explanation of this phenomenon may lie in extensive embolization of the vascular channels of the myeloid tissue by tumor plugs with consequent profound circulatory disturbances and hemorrhagic extravasations.

NORMAN C. BULLOCK M.D.

Ottolenghi C. and Alarcon F. O. Vertebral Osteomyelitis (Osteomyelitis vertebral). *Rev de ortop y traumatol* 1935 5 233

The authors report four cases of osteomyelitis of the spinal column and one case in which the differential diagnosis between osteomyelitis and tuberculosis could not be established definitely. Illustrative roentgenograms are presented.

The first case was that of a sailor thirty one years of age whose first symptom was intense pain in the lumbar region. The patient was sent to a hospital and operated upon for perinephritic abscess. After the operation the pain ceased, but the temperature

remained high. Examination in a hospital a month later showed osteomyelitis of the fourth lumbar vertebra with destruction and flattening of the vertebral body and newly formed bone which widened the vertebra and joined it with the third vertebra. The intervertebral disks were intact. From the bone abscess into the operative wound there was a fistula from which pus was discharged. Bacteriological examination revealed cocci and Gram positive diplococci. The patient recovered under treatment by rest and heliotherapy.

The second case was that of a woman twenty six years of age who sought treatment for a hard swelling in the right thigh which caused pain on walking. At the age of twelve years this patient had had a lesion which was diagnosed as tuberculosis of the glands of the neck and treated surgically. After the operation a fistula showing a torpid course remained. Two years later the patient was operated upon for osteomyelitis of the left femur. This condition had healed. The osteomyelitic abscess of the right femur was operated upon, and while the patient was under treatment the old process in the cervical region was reawakened. A roentgenogram of the cervical region showed osteomyelitis. The involved area was opened by an incision along the posterior border of the sternocleidomastoid surrounding the fistula and an indoform gauze drain was inserted. The temperature then fell to normal in a few days. After the discharge of sequestra, the wound healed slowly. The patient was ultimately discharged as completely cured. There was no appreciable functional defect of the cervical spine.

The third case was that of a man of twenty five years who, nineteen years previously had been operated upon for osteomyelitis of the elbow and seven years later was subjected to amputation of the left foot for osteomyelitis. In April, 1933, he began to have intense pain in the suboccipital region which increased until it was almost intolerable. Pneumonia developed and lasted for about two weeks. During this time the patient suffered intense pain and experienced difficulty in moving his head. A roentgenogram showed decalcification and indistinctness of the outline of the second and third cervical vertebrae. The pain was relieved by the application of a plaster cast to the neck. The abscess opened spontaneously beneath the cast and a large amount of pus was discharged. The suppuration continued for two months. At the end of that time the fistula closed spontaneously. Two foci requiring operation then developed in the fibula. The pus yielded a pure culture of staphylococcus aureus.

The fourth patient was a man twenty eight years of age whose illness began subacutely without the suddenness and intensity of the condition in the other cases. The pain stopped when a large abscess in the iliac fossa was drained. Percussion of the fourth and fifth lumbar vertebrae was painful, and this part of the spinal column was rigid and scoliotic. The condition resembled Pott's disease in some respects, but both its development and the recovery

following evacuation of the abscess were too rapid for that condition. Moreover, inoculation of guinea pigs was negative for tuberculosis and the pus showed staphylococci.

The fifth case was that of a man twenty eight years of age who had a history of pulmonary tuberculosis. The illness for which the patient sought treatment had begun two years previously with pain in the lumbar region. The roentgenogram showed destructive lesions, hyperostosis, increased density, and marked scoliosis at the site of the fourth lumbar vertebra. The disk between the third and fourth vertebrae was intact. The patient died of tuberculous meningitis. In spite of the history of tuberculosis, the authors believe the spinal process was osteomyelitic. This was indicated by the fact that it began suddenly with intense pain which was not relieved by rest. The diagnosis of osteomyelitis was supported also by the roentgenogram which showed preservation of the disk, and increased density and hyperostosis which are rare in closed Pott's disease. No abscess was formed. The authors believe that this was an atypical case of osteomyelitis, but as autopsy was not permitted the question cannot be definitely settled.

AUDREY GOSY MORGAN, M D

Pickin, H C and Pheasant, H C. Sacroarthro-genetic Talalgia. I. A Study of Referred Pain. *J Bone & Joint Surg*, 1936, 18: 111.

The term "sacroarthrogenic talalgia" is suggested by the authors to designate the typical syndrome of pain arising in the sacro iliac and sacrolumbar joints and ligaments. This pain is commonly referred to the gluteal or sacral regions or both, but may affect any or all parts of the genito inguinal region and any or all parts of the legs except the medial side of the lower leg and the sole of the foot.

The authors state that the literature on sciatica and low back pain is in a confused state for the following reasons: 1 The nomenclature is inaccurate, vague, or misleading. 2 The innervation of the joints involved has not been understood. 3 There has been a difference of opinion regarding the location of various dermatomic areas. 4 The tender regions have been described only vaguely.

This article is the first of a series of 5 to be based on an analysis of the findings of 506 complete examinations for low back disability. It presents an explanation of the innervation of the sacro iliac and sacrolumbar joints and the mechanism by which pain is referred when these joints are affected. The pain should not be confused with that of sciatica, radiculitis, neuritis or neuralgia, and does not result from irritation or compression of peripheral nerves. The joint disorders may be intra articular or extra articular and associated with lateral spinal scoliosis.

Upper intra articular sacral joint lesions produce pain only in the intergluteal triangle. When the extra articular ligaments are affected the pain is referred to the legs. Pain in the lateral crural region

is due to lesions of the posterior sacro-iliac and sacrospinous ligaments. In cases of such pain there may be atrophy of disuse, but objective neuropathological manifestations are absent. Eight areas may be examined for tenderness. The four of most importance are the lumbosacro-iliac angle, the posterior iliac interspinous notch, the lesser sacro-sciatic notch, and the free edge of the sacrotuberous ligament.

CHESTER C. GUY, MD

Golding F. C. *Spondylitis Ankylopoietica* *Brit J Surg*, 1936, 23, 484

As in many of the conditions classed as rheumatic disease the etiological factors of spondylitis are uncertain. The condition has been attributed to toxemia, the effect of temperature, trauma, metabolic disorders, and the parathyroid glands. The theory which has found most favor is that the disease is of infective origin, but direct evidence in support of this assumption is difficult to obtain in all cases.

Manual labor does not seem to be a contributory factor. Seventy three per cent of the patients whose cases are reviewed by Golding lived sedentary lives and 23 per cent were manual or outdoor workers. Only 4 gave histories of strains or exposure.

Roentgenograms were made in the cases of 124 patients—106 males and 18 females. Seventy nine males and 12 females presented clinical and roentgen evidences of spondylitis ankylopoietica. The remaining 27 males and 6 females had sacro-iliac disease without changes in the spine.

The ages of 114 patients are known. These patients are divided into 2 groups: (1) those with a clinical or roentgen diagnosis of spondylitis and (2) those with changes only in the sacro-iliac joints. The average age of the patients of Group 1 when they came for treatment was thirty six years and the average age when symptoms began was twenty five years. The average age of the patients of Group 2 at the corresponding times was twenty-eight years and twenty three years respectively. There is a fairly close agreement between the last ages in the 2 groups.

Blood calcium determinations in a number of cases of this series tended to show a slight hypercalcemia in some patients.

In many of the cases the history and clinical examination revealed a condition such as gonorrhea, ulcerative colitis or a septic tooth or antrum to which the disease might reasonably have been attributed, but there was a lack of uniformity in these findings and many patients appeared quite free of infective foci.

Marie and Lerche believed that spondylitis rhizomelia begins as a rarefaction of vertebral bodies which then produces a reactive hyperossification of ligaments surrounding joints and extending some distance from those joints. Ehrhardt postulated a syndesmogenous synostosis of all vertebral joints with ossification of the ligaments.

From the study of roentgenograms the author has come to the conclusion that the changes in the

sacro-iliac joints precede the destruction of the cartilage of the intervertebral facets and the calcification of the ligaments. It may be contended that the facets are involved before or at the same time as the sacro-iliac joints, but because of the limitations of roentgenographic technique this involvement can not always be demonstrated. It is true that the roentgenogram will reveal only gross pathological changes in the facets, but in many cases in the series reviewed there was well marked sacro-iliac disease with apparently normal intervertebral joints, and in others with a longer history, both the sacro-iliac and intervertebral joints were obviously involved.

Roentgenographic examination revealed that the sacro-iliac joints were involved in all cases presenting calcification of ligaments typical of spondylitis.

The changes in these articulations begin with an irregular destructive process affecting the joint surfaces which produces blurring and serration of the anterior and posterior edges of the joints in the roentgenogram. Next the cartilage space is destroyed and slight sclerosis becomes evident in the periparticular bone of the sacrum and ilium. The amount of destruction and sclerosis varies considerably in different individuals, but both processes progress until the joint is destroyed, when ankylosis takes place. The sclerosis then becomes less marked, and eventually there is continuity of bone between the sacrum and ilium with little or no trace of the joint.

Deposition of calcium in ligaments may be seen in the anterior and posterior longitudinal ligaments and the ligaments flava. It produces a streaky appearance of the bones, especially in the lower lumbar region. When the ligaments of the interarticular facets are calcified there may be a 'train track' effect, namely, a opaque parallel lines on either side of the midline. When the interspinous and supraspinous ligaments are affected there is a single line in the median plane. The bamboo spine is produced by calcification of the ligaments around the intervertebral disks. Other ligaments such as the radiate ligaments of the heads of the ribs, the pubocapsular and iliofemoral ligaments of the hip and the ligaments of the pubic symphysis may also show changes.

A comparison was made of the early history of patients with fully developed spondylitis and that of patients in whom only sacro-iliac disease was found. The sequence of symptoms in both groups was strikingly similar. This suggested that there is a definite type of clinical history associated with the disease in the early stages. In this connection the age and sex of the patient are of considerable importance.

The prespondylitic history consisted of a number of attacks of pain of a fibrositic character recurring over several years with intervening free intervals. These pains were referred to the muscles or the neighborhood of joints and were associated occasionally with synovitis which occurred especially in the peripheral joints and tended to resolve without deformity. The site of muscular pain appeared to be most

commonly in the thighs and buttocks. The pain varied from vague pain noticed especially when movement was begun after a period of rest to severe attacks sufficient to cause disability.

Sciatica was a fairly common early symptom, but did not appear to differ from the ordinary interstitial neuritis. In 11.2 per cent of the cases the condition had been diagnosed by a physician at some time as sciatica, in 14.5 per cent, as fibrositis or muscular rheumatism, and in 7.2 per cent, as infective arthritis.

The most important condition to be ruled out in the differential diagnosis is osteoarthritis of the spine. In most cases of the latter condition the patient is over fifty years of age or there is a history of strain, the so-called "laborer's spine." If roentgenograms are taken, the diagnosis should not be difficult. The early formation of an osteophyte is unlike the calcification of ligaments.

There are relatively few conditions which can be confused with spondylitis ankylopoietica. Spondylitis muscularis and spondylitis senilis are varieties of the same condition due to muscular weakness with secondary thoracic kyphosis. There is some narrowing of the disks on the anterior border and the vertebral bodies may be markedly deformed. Calcification of the ligaments is absent. The late stage of kyphosis adolescentium presents no difficulty as in this condition there is no calcification of ligaments and the wedged irregular vertebral bodies in the later stages are typical.

The more or less hopeless prognosis of fully developed spondylitis is well known. The outlook is more grave than in the average case of rheumatism as the patient is usually a young male adult who, after a varying period, becomes unable to earn a living. It appears that the condition does not progress invariably to the complete "bamboo spine." Some patients reach a stage of limited mobility with subsidence of the subjective symptoms.

It is difficult to assess the value of any form of treatment in this disease. The normal advance of the condition is slow. Patients without treatment may have periods of relief and exacerbation. The disease sometimes appears to reach a stage in which, although there is a fixed kyphosis, muscular pains are infrequent and there is some recovery of general health. Under such circumstances the treatment given at that time will receive credit which may not be justified.

NORMAN C. BULLOCK, M.D.

Ober, F. R. The Role of the Iliotibial Band and Fascia Lata as a Factor in the Causation of Low Back Disabilities and Sciatica. *J Bone & Joint Surg.* 1936, 18, 105.

Pain in the lumbosacral or sacro iliac regions may be due to contractions of the fascia lata and shortening of the iliotibial band. These tend to produce an abduction contracture of the femur which exerts a leverage action on the joints of the lower back, and to cause pressure on the sciatic nerve. The signs and symptoms are generally those of other

low back difficulties. The abduction sign is positive. This is elicited by abducting the femur with the patient lying on the unaffected side and with the lumbar lordosis obliterated. The leg will remain partially abducted, and the contracted iliotibial band can be palpated between the iliac crest and the trochanter.

The contraction results in poor posture with scoliosis, limitation of motion, muscle spasm, and tenderness. It can be relieved by incision of the iliotibial band and fascia lata and division of the intermuscular septa through a diagonal incision made from the anterosuperior spine to just above the greater trochanter.

The author reports forty-two cases, sixteen with bilateral, and twenty-six with unilateral, involvement. Marked or complete relief of the pain resulted in all cases, generally within from five to ten days after the operation.

CHESTER C. GUY, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Scaglietti, O. Present-Day Tendencies in the Surgical Treatment of Congenital Elevation of the Scapula (Indirizzi odierni nel trattamento chirurgico della scapola alta congenita). *Chir d organi di movimento*, 1935, 21, 287.

Scaglietti emphasizes the necessity for early treatment of congenital deformities, calls attention to the excellent esthetic and functional results of early operation for congenital elevation of the scapula, and reports four selected cases of the latter condition which were operated upon by Putti's method. In two of the reported cases the scapula was united to the spine by a bony process, and in one of these there was a true cartilaginous epiphysis at the end of the scapula.

The author states that in the interpretation of the roentgenograms the patient's age must be considered as the possibility of discovering a costiform process is determined by the degree of ossification of the process, which advances parallel with the ossification of other parts of the skeleton. In every case the plan of operation should be based on the findings of careful roentgen examination.

The best results are obtained when operation is done early. In two of the author's cases it was performed at the ages of four and a half and six years. At the age of thirteen years the deformity can be corrected only partially, and operative and post-operative complications are more liable to occur. In one of the author's cases osteotomy of the clavicle was necessary to bring the scapula down. In another, there was postoperative nerve compression. If no general contra-indications are presented, operation should be undertaken as soon as the diagnosis is made.

The article is accompanied by photographs, roentgenograms, colored illustrations, and references to the Italian and German literature.

M. E. MOORE, M.D.

Hauser, E. The Treatment of Torticollis. *Surg Clin North Am*, 1936, 16 251

This article deals chiefly with the treatment of myogenic torticollis which usually occurs at birth in difficult labor and most often on the right side.

The first symptom is swelling which as a rule involves the lower third of the sternocleidomastoid muscle is quite marked in the early stages, and is very tender. Later there is a definite contracture and the muscle feels fibrous. Section of muscle removed at operation reveals marked shortening. The process in the early stages seems to be inflammatory and is followed by replacement of the muscle tissue by fibrous tissue. Contracture of the muscle results in secondary contracture of the sheath and fascia and eventually asymmetry of the face and a compensatory scoliosis. Movements of the head are free except for the movement controlled by the shortened sternocleidomastoid muscle. This muscle is prominent from the anterior view. The head is drawn over toward the shoulder of the involved side and rotated so that the face is turned toward the opposite shoulder with the chin slightly tilted upward. These changes are believed to be the result of a circulatory disturbance. In congenital torticollis there seems to be a hereditary influence.

If untreated the condition becomes progressively worse but with treatment even the severe cases can be cured. Treatment should be instituted as soon as the tendency toward torticollis is noted.

Up to the age of six months the acute condition should be treated with rest, heat and massage. After the pain has been alleviated the child should be encouraged to turn its head in the corrective position and passive correction should be carried out.

When the child is older and the deformity is more developed division of the tendon of the sternocleidomastoid muscle by open operation is the only satisfactory method. In rare cases of severe muscle contracture resection of part of the muscle may be necessary. After the operative procedure, which is described by the author in detail, the head is manipulated into the overcorrected position and fixed in a plaster of Paris cast which includes the head and shoulders and corrects the secondary scoliosis in the thoracic area. The cast is left on for from two to six

weeks, depending upon the age of the child and the severity of the contracture. After its removal a modified Schanz bandage is applied.

Corrective exercises are most important, and are started from three to six weeks after the operation.
RUDOLPH S. REICH, M.D.

FRACTURES AND DISLOCATIONS

Oldberg, E. The Neurosurgical Considerations of Fracture of the Spine. *Surg Clin North Am*, 1936 16 291

The author feels that the immediate determination of the location and extent of the neurological lesion in patients with fractures of the spine is of the utmost importance. The sensory level, the state of motor power, and the condition of the reflexes must be carefully noted at the first examination as subsequent changes progressive or regressive, are of the greatest value in determining the treatment. Adequate roentgenograms are essential. The treatment should be conservative unless there is mechanical pressure upon the cord or equine roots which can be relieved only by operative means. Fractures of the cervical spine should be treated most conservatively as traction in extension is successful in most cases. Laminectomy should be done only if a lumbar puncture after from thirty six to seventy two hours of traction shows a complete block. In injury to the thoracic spine traction is not so efficacious. Lumbar puncture should be done promptly and if a block is demonstrated, laminectomy should be done as an emergency operation, preferably under local anesthesia. When no block is found, the treatment should be conservative.

In fractures of the lumbosacral spine repeated neurological examinations are of great importance. Early laminectomy should be done in initial complete caudal lesions with marked bone deformity and also in the presence of increasing symptoms. The general management of these cases is of great importance. The author advises the use of an air mattress when possible. He recommends also the use of an indwelling catheter from the onset when sphincter paralysis has occurred.

BARBARA B. SYMONS, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Freilich, E. B., and Coe, G. C. Angiosarcoma Case Report and Review of the Literature 1m J Cancer, 1936, 26 269

A great deal of confusion exists today with regard to the so called angiohistiocytic sarcomas. For many years the term "angiohistiocytic sarcoma" was loosely applied to certain endotheliomas. The present tendency, however, is to limit it to cellular angiosarcomas in which the unit is the vessel and not the endothelial cell. The authors call a tumor an angiosarcoma when careful microscopic study of the neoplastic tissue reveals distinct vasoformation tendencies. True angiohistiocytic sarcomas are not commonly encountered. In the literature since 1918, only twenty-nine cases are recorded. Reports of twenty-six were available to the authors for review. Thirteen of the subjects were males. Eleven of the patients were between forty and seventy years of age, eight between twenty and forty, and six between one and twenty years. One was a child one and a half months old. In the great majority of the cases the diagnosis was made by biopsy. Only six cases showed metastases. Twelve cases went on to a fatal termination with or without surgical attention.

Though there are records of several angiosarcomas arising from osseous tissue, as in the femur and the clavicle, no record of an angiosarcoma of the scapula was found. Such a tumor was observed by the authors in a man sixty-one years of age. This patient exhibited a definite tumor tendency, a sort of tumor diathesis. Four tumors were present: an angiosarcoma of the scapula with metastasis, an adenofibroma of the breast, a fibroma of the stomach, and a fibroma of the skin. JOSEPH K. NARAT, M.D.

BLOOD, TRANSFUSION

Karavanov, G. Phagocytic Activity of the Leucocytes of Preserved Blood (Phagocytnaia Tsvetnost' Leukotsytov de Konservirovannogo Krovi) Vor khir arkh, 1934, 32 87

In studies of the phagocytic activity of the leucocytes of preserved blood the author kept citrated blood for from one to fourteen days in a refrigerator at + 6 degrees and then precipitated the leucocytes, carefully washed them free from the sodium citrate solution, mixed them with an equal amount of a one-day staphylococcus culture, left the mixture in a thermostat at 37 degrees for from twenty to twenty-five minutes, and then examined Giemsa stained smears.

On the first day of the period of preservation (two hours after the beginning of the experiment), phagocytosis was practically complete, nearly all of

the leucocytes containing bacteria. During the succeeding days, it gradually diminished. On the third day it was 79 per cent, and on the fifth day 39 per cent. By the eighth or ninth day it had completely ceased. That the phagocytic power of the leucocytes also decreased was evidenced by a gradual decrease in the number of bacteria phagocytized by the individual cells. However, occasional cells retained a phagocytic action, though it was weak, for as long as twelve days.

The author draws the following conclusions:

1. With the described method of preserving the blood with citrate solution the phagocytic activity of the leucocytes is maintained for five or six days, but decreases rapidly after the second day.

2. To increase the bactericidal power of the blood in cases of infection, the blood used for transfusion should be fresh or should not have been preserved longer than two days.

As sodium citrate has an unfavorable effect on phagocytic action, the leucocytes are carefully washed free from it before they are used in experimental studies. The question whether the leucocytes of transfused blood are capable of phagocytosis is to be answered in the affirmative as they are washed free from sodium citrate by the patient's own blood. (G. ALIPOV) JOHN W. BRENNAN, M.D.

Hesse, E. The Use of the So-Called Universal Donor in Blood Transfusion (Ueber die Verwendung des sogenannten Universalpenders bei der Bluttransfusion) Deutsche Ztschr. f. Chir., 1935, 245 371

Until recently, the transfusion of blood from a universal donor was considered to be as satisfactory as transfusion from a donor belonging to the same blood group as the recipient. It has been recommended that, in military practice, universal donors be used almost exclusively in order to relieve the military surgeon of the necessity for blood typing. In fact, preserved blood of only the O group has been held in readiness. This attitude with regard to the universal donor has been fought with increasing success by the Institute for Research on Blood Transfusion in Leningrad.

Through questionnaires the author learned of 46 cases of hemolytic shock following the transfusion of universal donor blood, 20 of which were fatal. He believes that the frequency of such shock is much greater than is suggested by this number. The transfusion of large amounts (over 200 c cm.) of blood from a universal donor to a very anemic patient may result in recurrent agglutination of the patient's blood followed by hemolysis. This is especially apt to occur if the titer of the donor's serum is high with respect to the erythrocytes of the recipient. In determinations of the titer of the serum

of 104 universal donors which were made at the Research Institute in Leningrad the titer was found to be above 1:32 with respect to erythrocytes of the A group in 42.3 per cent of the cases and above 1:32 with respect to erythrocytes of the B group in 32.7 per cent of the cases. In 14 cases it was 1:128, and in 3 it was 1:256. In the transfusion of blood from a universal donor with a titer between 1:8 and 1:16 no complications occurred but when the titer was even moderately high, signs of hemolytic shock appeared. When blood of a similar group was transfused, no change from the normal was shown by orthostatic or clinicostatic tests whereas when the blood of a universal donor was used there were changes in the pulse rate up to 40 beats per minute. It is therefore apparent that the nervous system is very sensitive to blood of an unlike group.

Especially dangerous is the transfusion of blood from a universal donor to a recipient belonging to the A group. Of 22 patients with hemolytic shock whose blood group was known 15 belonged to the A group, 6 to the B group and 1 to the AB group. The titer of the donor's blood with respect to standard erythrocytes is of only approximate significance, whereas its relationship to the erythrocytes of the given patient is of decisive importance.

The author concludes that there are no truly universal donors and that therefore the donor and

recipient should be of the same blood group. In emergencies in which the use of a so-called universal donor cannot be avoided, no more than 200 c cm of blood should be transfused to a patient belonging to a dissimilar blood group. Moreover, even with this limitation transfusion from a so-called universal donor is permissible only if the patient's erythrocyte count has not fallen below 2,000,000 and the titer of the donor's serum with respect to the patient's erythrocytes does not exceed 1:16. The use of the so-called universal donor is justifiable only in cases in which the patient is in danger of death and no other donor can be found or the blood group of the patient cannot be ascertained.

(HAUMANN) WILLIAM C. BECK, M.D.

Fredrikson H. A Case of Fatal Kidney Injury After Blood Transfusion (Fall von toedlich verlaufendem Nierenschaden nach Bluttransfusion). *Acta obst et gynec Scand* 1936, 16: 78.

The author reports a case of fatal acute nephrosis with oliguria which developed after two blood transfusions given on account of surgical shock following an operation for extra uterine pregnancy with moderate intraperitoneal hemorrhage. He then presents a brief survey of the fatal cases of blood transfusion reported in the literature and discusses their causes.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE, POSTOPERATIVE TREATMENT

Cavalli, M. The Behavior of the Lymphatics in the Autoplastic Skin Graft (Sul comportamento dei linfatici nell'innesto autoplastico della pelle) *Sperimentale*, 1935, 89 504

The author studied the lymphatics in thirty six grafts on the ears of eighteen rabbits. Rectangular grafts measuring 1 by 2 cm and including subcutaneous tissue and perichondrium were removed from the inner aspect of one concha and transplanted to the corresponding site on the other ear, where they were sutured in place with fine silk. After periods of from one to twenty days the animals were killed, the lymphatics injected according to the technique of Ottaviani, and the specimens fixed in formalin. The graft hearing area was then cut out and passed through a series of alcohol solutions. After the absolute alcohol treatment the specimen was cut down until only the graft and a small frame of surrounding tissue remained. This was clarified in xylol and mounted in balsam. The preparations so made showed the lymphatic plexuses clearly, as is evident from the illustrations.

During the first three days the lymphatic plexuses of the recipient skin were well injected but stopped sharply at the graft margins. In the four- and five-day grafts a group of lymphatic channels within the border of the graft and continuous with the lymphatic channels of the recipient area were found uniformly. At the end of six or seven days the rich plexuses of the recipient area still stopped in part at the edges of the graft, but in part anastomosed with slender, winding channels across each border of the graft. Eight day grafts showed anastomoses along the entire periphery which sometimes led to a plexus within the graft. After ten days a lymphatic plexus with wide meshes occupied the entire graft. Thereafter, the connections became more ample until, after twenty days, it was difficult to distinguish between the lymphatics of the graft and those of the recipient area.

The author calls attention to the close similarity between this process and the re-establishment of blood flow. The rapidity of restoration suggests that the existing channels are used. Cavalli concludes that the return of lymph flow is an important factor in the successful taking of a graft.

(V BURRELL) THOMAS W STEVENSON, JR, M D

Powers, J H. Observations on the Effect of Hyperventilation on the Vital Capacity of Surgical Patients. *J Thoracic Surg*, 1936, 5 306

Abdominal operations are followed by a postoperative decrease in the vital capacity. Postopera-

tive pulmonary complications are related to lowering of the vital capacity. An incision in the upper part of the abdomen causes a markedly greater lowering of the vital capacity than an incision in the lower part of the abdomen. Operations on the extremities or perineum do not seem to affect the vital capacity.

Pulmonary hyperventilation immediately after anesthesia and for the first three days after operation was suggested by Henderson and Haggard as a prophylactic measure against pneumonia. This method has been investigated by many workers, some of whom report favorable results whereas others state that they noted no marked improvement.

The author reports on a small series of cases in which he studied the effect of hyperventilation on the vital capacity. The vital capacity was determined daily, before and after operation, by means of a Collins spirometer. All observations were made at least two hours after meals with the patient in the semi sitting position. The readings represented the best expiratory and inspiratory effort for each day. Only cases without drained wounds were studied.

The five cases of operation on the upper part of the abdomen which were treated by hyperventilation showed an increase of from 16 to 23 per cent in the vital capacity as compared with the untreated cases, and the cases of operation on the lower part of the abdomen an increase of from 23 to 26 per cent as compared with the controls. Although the number of cases was small, these findings indicate that hyperventilation keeps the vital capacity at a level higher than that in cases in which it is not used.

Changes in the usual course level of the vital capacity are indicative of a postoperative complication. Lowering of the vital capacity may occur much earlier than it is recognized clinically. In a case of hematoma in an abdominal wound, for example, the vital capacity is lowered for a few days before the change is detected clinically. Abdominal binders, adhesive strapping, and surgical abdominal dressings do not influence the vital capacity to any marked extent. BENJAMIN G P SNAFIROFF, M D

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

McLellan, P G. Leptothricosis. *Ann Surg*, 1936, 103 422

McLellan reports a fatal case of leptothrix infection. At autopsy, a lung abscess and metastatic abscesses of the spleen, liver, retroperitoneal tissues and forearm were found. The pus drained from the retroperitoneal and forearm abscesses yielded pure cultures of leptothrix, as did the pus obtained from the liver abscesses after death.

The treatment is that indicated for any pyemic infection. Although roentgen irradiation, the use of vaccines, and iodide therapy have not yet been proved of value in this infection, McLellan concludes from their effect in infections due to higher bacteria that they should be given a further trial.

ELIZABETH M. CRANSTON

Hirvisalo K. F. The Origin and Action of Bacteriophages (Zur Entstehung und Wirkung der Bakteriophagen) *Acta Soc. med. Fennicae Duodecim* 1935 18 Fasc. 2

The author studied the behavior of the bacteriophages occurring in the shore water of Helsingfors on the bacteria occurring in the same water (forty eight different strains, of which thirty seven were colon bacilli) and compared it with the action of the same bacteriophages on different bacterial strains from laboratory collections (twelve strains of colon bacilli, sixteen bacteria belonging to the parathyroid group, one strain of bacillus dysenteriae and eight proteus strains).

He found that the bacteriophages which affect laboratory strains were much more frequent than those corresponding to the bacteria isolated from the water. Many of the strains of colon bacteria eventually became lysoresistant. Others were perhaps destroyed by the action of the bacteriophages or otherwise.

In order to prove the effect of the bacteriophages in the water, different quantities of a lyso-sensitive colon bacterium were added to two aquaria. No evident effects produced by the bacteriophages on this bacterium were observed.

Apostoleanu E. and Vladutiu O. Experimental Studies on the Variations of the Hydrogen Ion Concentration in the Evolution of Septic Wounds and in Relation to the Treatment Employed (Recherches expérimentales sur les variations du pH dans l'évolution des plaies septiques et en rapport du traitement appliqué) *Lyon chir* 1936, 33 28

Although few studies have been made of the hydrogen ion concentration of wounds, this is believed to be one of the important factors in healing. Schade (1921) and Habler (1927) gave the following figures

for various exudates: serous, from 7.3 to 6.8, chronic inflammatory, from 7.1 to 6.6, cold abscesses from 7.0 to 6.9, and acute purulent, from 6.5 to 6.0 or less. The fluid from edematous tissues has a hydrogen ion concentration of from 7.3 to 7.15 (Hirschfelder 1924). Schade (1926) found that when experimental wounds are opened, the secretions become alkaline within a half hour, probably because of the diffusion of carbon dioxide. According to Gurgoloff (1924), all wounds healing by first intention are acid and the maximum acidity is reached twenty-four hours after the operation.

Sympathectomy promotes wound healing. In studies of its effect reported by Fontaine and Young in 1928, the reaction of wounds in sympathectomized animals was more nearly neutral than that of wounds in the controls. Fontaine and Young believe that a hydrogen ion concentration of 7.07 is most favorable for healing.

The experiments which are the subject of this article were carried out on horses. Wounds on the neck were produced in various ways, infected in various ways, and subjected to various methods of treatment. The hydrogen ion concentration of the surface exudates and of the granulations was determined with the potentiometer of Michaelis. From the results the authors drew the following conclusions:

1. The acidity of the exudates is due to the proteolytic action of the leucocytes rather than to the infection.

2. Gas gangrene, which is particularly favorable to the growth of bacteria, is associated with increased alkalinity. As the condition of the wound improves and the infection becomes arrested, the reaction becomes acid (pH 6).

3. Vesicants such as cantharides and ammonium chloride, which favor local leucocytosis, cause an acid reaction and more rapid healing.

4. Dalin's solution, because of its alkalinity, causes excessive granulation, but as the solution has little toxicity with respect to the leucocytes, its use has been attended with considerable success.

5. When alkaline solutions such as sodium bicarbonate are applied to a wound, the influx of leucocytes is feeble and healing of the wound is delayed.

ALBERT F. DE GROOT, M.D.

PHYSICO-CHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Orton, G. H. Calcium Changes and Their Importance in Diagnostic Radiology *Brit J Radiol*, 1936, 9 102

Calcium changes are of the utmost importance to the roentgenologist from the standpoint of diagnosis. The author briefly discusses the general principles of calcium metabolism as regards absorption, utilization, and excretion. Derangement of any of these processes may result in demonstrable changes in the skeleton. The rôle of the parathyroid hormone is also considered. The effect of these factors on the bone changes in rickets, osteomalacia, and generalized osteitis fibrosa cystica are described. The balance of the serum calcium and phosphorus levels in the blood plays an important part in these conditions, and its determination may be of value in differentiating various types of lesions producing somewhat similar bone changes.

Generalized osteoporosis may result from various systemic conditions. Hypertthyroidism may cause it, probably because of an excessive excretion of calcium. Its association with renal glycosuria has also been reported. It has been produced experimentally in animals by diets deficient in calcium.

Localized calcium changes in bone may be the result of variations in the blood supply. Increased vascularity leads to decalcification, and diminished vascularity to increased calcification and sclerosis. These results may sometimes be produced by pathological processes adjacent to, as well as in, bones. Among the conditions in which disturbances of the blood supply secondary to trauma probably account for the changes present are Kummel's disease and various types of so called osteochondritis such as Preiser's, Kienboeck's, Kochler's, and Freiberg's disease. The changes in healing or ununited fractures also support this theory.

Ischemic sclerosis may be responsible for such conditions as osteopetrosis, Albers-Schoenberg's disease, Paget's disease, syphilitic osteitis, and the later stages of osteomyelitis. Osteoclastic and osteoblastic metastatic bone lesions can probably be explained by the assumption that the former represent rapidly growing tumors with hyperemia, and the latter are slowly growing types with relatively poor vascularity.

Calcium may be deposited also in any connective tissue of low metabolism if the blood supply is decreased by injury, infection, or degeneration. This fact affords a plausible explanation for the occurrence of calcification in various fibrocartilaginous structures, in tendons such as the supraspinatus tendon, in the falx, pineal body, and choroid plexus, in hematomas, phleboliths, and angiomas, and in

various parts of the circulatory system. In tumors which are degenerating, such as fibromas, lipomas, thyroid adenomas, and cerebral tumors, calcification is common.

Calcinosis or pathological calcification in which deposits occur in the skin and subcutaneous tissues and occasionally also in deeper interstitial connective tissues is likewise thought to be due in part to impaired vascularity. Similar changes have been noted in association with chilblains and Raynaud's disease.

Although these explanations for the calcium changes noted in a large variety of conditions seem adequate, the author calls attention to the fact that it is still impossible to explain the inconstancy of findings under apparently identical conditions.

ADOLPH HARTUNG, M.D.

Hodges, F. M. Roentgen Therapy of Certain Infections *Am J Roentgenol*, 1936, 35 145

The early work on the roentgen therapy of infections was done in America, but in recent years roentgen irradiation has been more generally used in such conditions in other countries. The action of irradiation on various tissues has been studied by several pathologists. Polymorphonuclear leucocytes and especially lymphocytes are very radiosensitive. The early destruction of some of these cells may more rapidly liberate vital substances, such as ferments or antibodies, contained within the leucocytes for defensive purposes. Usually the more marked the leucocytic infiltration, the quicker and more marked the response to irradiation.

The author has found roentgen therapy very effective in many types of infections. Small doses of unfiltered rays (85 kV, 125 r) have given good results in erysipelas. In furunculosis, filtered roentgen rays are more effective than unfiltered low-voltage rays. Several weekly treatments of about 125 r with the use of 125 kV, an aluminum filter of from 4 to 6 mm, and a distance of 10 in. will not only cause the disappearance of existing furuncles but abort newly forming lesions. In the treatment of carbuncles, small doses of 100 r with the use of 85 kV and unfiltered rays give the best results. Very often a large dose will abort the very early lesion. Infected rhinophyma responds to 300 r of filtered irradiation. In ordinary granuloma, doses of from 700 to 900 r of unfiltered rays are effective. In cases of blastomycosis, doses of from 500 to 600 r with the use of 125 kV and an aluminum filter of from 4 to 6 mm have yielded good results. Iodine therapy should be given with the roentgen therapy. In cases of parotitis the author has obtained good results from 125 r with the use of 125 kV, an aluminum filter of from 4 to 6 mm, and a distance of

10 in. Five cases of Mikulicz's disease responded favorably to from 100 to 400 r with the use of 200 kv, 1 mm of aluminum 1 mm of copper, and a distance of 50 cm. Roentgen therapy was efficacious in many cases of localized infections about the face and extremities.

EARL E. BARTT, M.D.

Merritt, E. A. and Rathbone R. R. The Roentgen Treatment of Malignancy Using Filtration Equivalent to 5 mm of Copper. *Am J Roentgenol*, 1935 35 334

Following the work of Thoreaus the authors have used for the past fifteen months filtration equivalent to 5 mm of copper (1.25 mm of tin 0.25 mm of copper and 1.0 mm of aluminum) a 220-kv peak (180 kv effective) and 20 ma with a 50-cm distance and 10 r/min (in air) for the treatment of deep malignancies and with a 25-cm distance and 40 r/min for the treatment of a number of cutaneous or relatively superficial malignancies (lip, bucca, cervical glands). On the basis of their experience so far they express the opinion that as the filtration is increased to 5 mm of copper there is a marked widening of the lethal doses for cutaneous and subcutaneous tissues, in other words that the underlying subcutaneous structures can be better protected while a lethal dose is given to the skin. In accordance with this experience it was noted that the Coutard method may be modified to greater advantage by changing the filtration in addition to other factors.

As is known, the Coutard method of irradiation therapy is based upon four principal factors: (1) an intense epithelitis and epidermitis, (2) low intensity of irradiation, (3) daily treatment over a period of several weeks and (4) the use of filtration with about 2 mm of copper. With the goal of dosage set

as an intense epithelitis and epidermitis opinions still vary concerning the second and third factors. According to the authors no appreciable change in the relative lethal dose for skin and subcutaneous tissues is produced by varying the intensity from 10 to 75 r/min. The higher intensity is considerably less time consuming and therefore more economical. With regard to the protraction, the authors state that relatively sensitive malignancies can be apparently destroyed easily with a higher daily dose in about three weeks. However, if the malignancy is relatively resistant the time should be protracted over from four to six weeks, a lower daily dose and a higher total dose being given. The authors believe that protraction increases the relative tolerance of the subcutaneous tissue to irradiation.

However, the results are improved best by increasing the filtration to 5 mm of copper equivalent. The authors observe that the difference lies chiefly in the healing of the epithelitis and epidermitis and in the late effects. If light filtration is used, there is a profound modification of the underlying supporting structures evidenced by slow healing in tense pain and when healing occurs atrophy and marked telangiectasis. When the higher filtration is employed the modification of the underlying structures is milder and healing occurs with considerably less permanent damage.

Four successfully treated cases of advanced malignancy (one of the face, one of the ear, one of the descending colon, and one of the stomach) are reported briefly to illustrate the advantage of the modified Coutard technique. The authors conclude that the method is applicable to every part of the body, and that inoperable intra-abdominal malignancies have now been brought into the field of roentgen therapy.

T. LECUTTA, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Wilson, H., and Roome, N. W. The Effects of Constriction and Release of an Extremity. An Experimental Study of the Tourniquet. *Arch Surg*, 1936, 32 334

To determine the causes of complications resulting from the prolonged use of a tourniquet the authors carried out a series of experiments on dogs.

In the cases of dogs with constriction applied for from two to twenty hours the mortality was 69 per cent. When the constriction was released there was a transient fall of the blood pressure with recovery followed by a more gradual and more pronounced fall which continued until death. The mortality of control dogs was 17 per cent.

The chief causes of death from release of the tourniquet were found to be the formation of toxic tissue metabolites, the products of anaerobic bacteriolysis, and the withdrawal of fluids from the circulation to be poured out into the limb as a transudate. Amputation of the damaged limb followed by transfusion alone had a tendency to reduce the mortality.

Dissection and roentgenographic studies showed that the vessels remained patent. The mortality from constriction and release of an extremity increased with the duration of the ligation.

WILLIAM F. SNACKLETON, M.D.

Smith, A. C. Medical Aspects of Aviation. *Arch Otolaryngol*, 1936, 23 139

During the thirty-two years of modern aviation amazingly rapid progress has been made, and in this progress medicine has contributed invaluable aid. The lines along which medicine has aided aviation are discussed by the author from the following angles: (1) the selection of the pilot, (2) the prevention and cure of diseases to which aviation predisposes both pilots and passengers, and (3) general public health measures. Aviation has called upon practically all of the medical specialties. Of particular value to it have been the contributions of the otolaryngologists. There still remain many unsolved medical problems requiring continued study and experimentation.

WALTER H. NADLER, M.D.

Hamman, L., and Wainwright, C. W. The Diagnosis of Obscure Fever. I. The Diagnosis of Unexplained, Long-Continued, Low-Grade Fever. *Bull Johns Hopkins Hosp*, Balt., 1936, 58 109

The questions to be asked about long continued fever of unknown origin are:

1. What is the ultimate diagnosis?

2. Are there any features that may give a clue to the diagnosis?

3. On the height of the fever and the duration of the symptoms have a bearing on the diagnosis?

There are very few articles presenting an analysis of the problem.

The authors studied the records of ninety cases of long continued fever. They divided the cases into two groups: those of low grade fever only occasionally reaching 100 degrees and rarely 101 degrees F., and those of higher fever with symptoms which were usually incapacitating. This report deals only with the first group.

There were twenty six patients with a long continued, low grade fever. An accurate diagnosis was finally made in the cases of ten and a presumptive diagnosis in the cases of six. The accurate diagnoses were: Malta fever, three cases, pulmonary tuberculosis, two cases, hypernephroma, two cases, Hodgkin's disease, one case, ureteral stricture, one case, and tertiary syphilis, one case. The 6 questionable diagnoses were: pulmonary tuberculosis, mesenteric gland tuberculosis, tuberculosis, perirectal abscess, rheumatic fever, Malta fever, and multiple myeloma.

Seventeen of the thirty six patients with long-continued, low-grade fever recovered, although a satisfactory diagnosis was never made. In the cases of the remaining three, the fever continued for from three to thirty years and no satisfactory diagnosis was ever made. Reports of illustrative cases of each group are presented.

The possible causes of the fever in the cases in which a satisfactory diagnosis could not be made are discussed. The possible causes include specific infections, foci of infection, and a third uncertain group including metabolic and neurogenic conditions.

Whereas tuberculosis is the most common cause of long continued, slight fever, it is seldom responsible for unexplained, long continued slight fever. The intracutaneous tuberculin test should be used more frequently to assist in the diagnosis of obscure cases. The diagnosis of Malta fever, missed in former years, can now be made by specific biological tests. With regard to rheumatic fever, it is thought that low grade, long continued fever is much more frequently the only sign of rheumatic infection than is suggested by the reviewed series of cases.

The results of this study and the study made by Kintner and Rowntree indicate that foci of infection in the tonsils, teeth, sinuses, appendix, or elsewhere are rarely the cause of low grade fever. Subsidence of the fever following the extraction of an infected tooth was observed in only one of the cases reviewed. Among the uncertain causes of low grade fever are diseases of the thyroid and ovaries. Woodvatt

reported a case in which fever was associated with ichthyosis because of a disturbance of the therm regulating mechanism. Also cited is evidence indicating a neurogenic origin of low grade fever.

HOWARD L. ALT, M.D.

Hunter F. T. Hutchinson Boeck Disease (Generalized 'Sarcoidosis'). *New England J. Med.*, 1936, 214: 346.

Hutchinson Boeck sarcoid is a generalized systemic disease. At times it affects not only the skin but also the lymph glands (both peripheral lymph glands and those at the hilus of the lungs), the spleen, the parenchyma of the lungs, the phalanges of the fingers and toes, the mucous membranes, the conjunctivae, and the parotid gland. In its power of invading many organs it simulates lymphoblastoma. It should be studied by the internist, the surgeon and the roentgenologist.

Hunter reports a case which showed changes limited to the skin, the lymph nodes and the spleen. Today, four years after he first came under observation, the patient is apparently cured.

GEORGE A. COLLATT, M.D.

DUCTLESS GLANDS

Cramer W. and Horning E. S. Experimental Production of Tumors by Estrin. *Lancet* 1936, 230: 247.

In the experiments reported by the authors, male and female mice, both normal and castrated, were subjected to the prolonged influence of estrin administered by painting the skin twice weekly with a 0.05 per cent solution of estrin in chloroform. Two different strains of mice were used: one a mixed strain with a low incidence of spontaneous mammary tumors and the other a specially inbred strain with a very high incidence of spontaneous mammary tumors (about 10 per cent). The males of the latter strain never develop cancer spontaneously.

As a result of the painting of the skin with the estrin solution, all of the five males of the high cancer strain which were subjected to the treatment for a sufficiently long period developed mammary cancer and two of them developed tumors in both the right and the left axilla. The first tumor appeared after sixteen weeks, and the last tumor after twenty-one weeks, of estrin painting.

An apparently paradoxical result was that none of the females of this strain developed a tumor after treatment with estrin continued for more than six months, although tumors appear in from 60 to 100 per cent of untreated females of this strain when they are over six months old. Of the mixed strain, neither the males nor the females have so far developed a tumor.

The sensitiveness of the male mamma in its carcinogenic response to estrin as contrasted with the great insensitiveness to estrin of the female mamma in animals of a pure strain with a very high spontaneous incidence of cancer in the female mamma suggests that either the female organism is able to destroy an excess of estrin administered experimentally or that the carcinogenic response of the mammary epithelium depends upon an indirect rather than a direct interaction between estrin and the cells.

Since estrin preparations are now being used extensively in gynecological practice, the authors believe it may be well to point out that the carcinogenic changes described by them were produced by the administration of estrin continued over a period representing a considerable fraction of the normal span of life of the mouse and corresponding in man to a period of from seven to ten years, whereas the skillful therapeutic administration of estrin preparations in clinical cases is limited to short periods of a few weeks or months. Therefore the development of mammary cancer described should not be used as an argument against the therapeutic use of estrin preparations.

NORMAN C. BULLOCK, M.D.

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AUGUST, 1936

International Abstract of Surgery

Supplementary to
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INTERNATIONAL ABSTRACT OF SURGERY

AUGUST, 1936

ABSTRACTS OF CURRENT LITERATURE SURGERY OF THE HEAD AND NECK

HEAD

Pozzan, A. Compensatory Hypertrophy of the Salivary Glands (Sull'ipertrofia compensatoria delle ghiandole salivari) *Arch ital di malattie dell'apparato digerente* 1936, 5 64

Pozzan studied the morphological changes and the weight changes of residual salivary glands in dogs following partial sialectomy.

He found that ablation of either one parotid or one submaxillary gland is not followed by any appreciable constant change in the weight or size of the corresponding contralateral gland. Simultaneous removal of both the parotid and the submaxillary glands on one side is followed by a definite increase in the size and weight of the contralateral glands. This compensatory hypertrophy becomes noticeable after twenty five days and persists for more than one hundred fifty days. At the end of that time, if the weight of the corresponding contralateral gland is taken into account the increase in weight is found to be approximately two tenths of the probable original weight. Control experiments showed that there is little, if any, difference in structure or weight between corresponding glands of the two sides.

Simultaneous removal of the parotid submaxillary, sublingual and orbital glands on one side leads to a considerable increase in the weight and size of the corresponding opposite glands. This increase is most marked in the parotid gland and after twenty five, forty five, and one hundred fifty days amounts to one tenth, three tenths, and nine tenths of its weight, respectively.

Total removal of the salivary glands (parotid submaxillary, sublingual and infra-orbital) with the exception of one in the series leads to hypertrophy of the residual gland which is most marked in the parotid gland and least marked in the submaxillary gland.

The absence of changes in form suggests that the process of hypertrophy progresses uniformly throughout the gland. One exception is the orbital

gland which, because of its peculiar anatomical relations, expands most readily downward and therefore becomes most markedly hypertrophied in its lower third. This gland assumes an oval outline. Its parenchyma shows no changes in color or consistency.

Following partial sialectomy (removal of at least two glands), the histological picture of the remaining glands from seven to twenty-five days after the operation presents characteristic changes which indicate a proliferative activity of the parenchyma. This is expressed by typical nuclear and protoplasmic changes and the appearance of small aggregations of serous and mucous cells, tubules, and newly formed acini within the interacinous stroma.

A few months later, hypertrophy is complete and on microscopic examination the gland is found practically normal.

In none of the author's experimental animals did the lacrimal glands undergo hypertrophy after sialectomy.

Histological examination of the oral mucosa and the pharynx (vestibule, soft palate, and pillars) reveals only slight hypertrophy of the regional mucous glands.

RICHARD E. SOMMA

EYE

Wheeler J. M. Ectropion A Problem for Eye Surgeons. *South W J*, 1936, 29 377

This is a contribution from one who has had much experience combined with great judgment and skill. The gross elements of the procedure indicated in ectropion are known to most ophthalmic surgeons, but the niceties of technique have not received sufficient attention and it is upon these apparently small details that the success of the treatment depends.

In the technique used by Wheeler the scar tissue of the lower lid is removed as thoroughly as possible by a straight incision above, parallel with the lid margin and a curved incision below. The lower lid

has been released so thoroughly that the lid margin will usually come into apposition with the upper lid margin and lie relaxed against the eyeball. Any scar tissue which prevents this receives attention. By the removal of rectangular strips of epithelium from corresponding places in the upper and lower lid margin two intermarginal adhesions are made in straddle the cornea. A graft slightly larger than the defect in the lower lid is dissected from the upper lid. No undermining is necessary. Forceps are not used to pick up this tissue. A knife is carried under the graft and then lifted with a hook. The graft is placed on a gauze pad dampened with normal saline solution at body temperature and bits of muscle are removed. Sutures are carried through the graft and through the skin surfaces surrounding the graft as near the edges as possible.

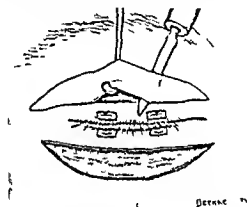


Fig. 1 Sutures have been tied to bring the denuded areas on the lid margins into firm apposition so that two intermarginal adhesions will form. The graft is being removed from the upper eyelid to be placed on the prepared bed of the lower lid.

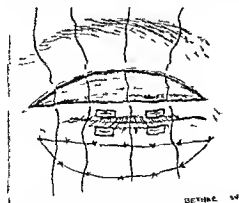


Fig. 2 The graft from the upper lid has been sutured in position on the lower lid. Sutures have been placed to close the wound in the upper lid. No undermining is necessary.

When the graft is in place the lids are covered with two pieces of gutta percha with the grains crossed and vaseline smeared over them. Over the gutta percha sterile gauze is packed. The gutta percha overlaps the graft slightly and the gauze overlaps the gutta percha. Over the dressing are placed strips of adhesive plaster to produce as much pressure as possible. These strips are applied obliquely so that they will escape the corner of the mouth.

The first postoperative dressing is done after five days and with great care to prevent hemorrhage. At the first dressing the intermarginal sutures are removed but the patient is cautioned not to open the eyes. The pressure bandage is then re-applied and thereafter is changed every three days over a period of two weeks. At the end of that time the sutures are removed. The graft is then anointed with vaseline twice daily for two weeks to prevent drying.

VIRGIL WESCOTT, M.D.

Thygeson P. and Mengert W. F. The Virus of Inclusion Conjunctivitis. Further Observations. *Arch. Ophthalmol.* 1936 15 377

The virus causation of inclusion blennorrhoea described by Lindner was confirmed in a report by Thygeson published in 1934. Evidence was presented to indicate that the basophilic cytoplasmic inclusion bodies were virus colonies similar to those in psittacosis and of the same nature as those in vaccinia, varicella, fowlpox, molluscum contagiosum and infectious ectromelia.

Since 1934 the authors have seen 8 additional cases in 5 of which there was no secondary infection. Three showed staphylococcus aureus organisms which disappeared after a few days of treatment with a 0.5 per cent silver nitrate ointment. In 5 the symptoms were severe for from ten to fourteen days and then subsided into the chronic stage. In the 3 others they were mild indicating that inclusion blennorrhoea cannot be diagnosed on the basis of the clinical signs alone. Changes in the cornea were absent in all. In 2 cases in which severe upper respiratory tract infections developed no inclusion or free bodies were found. In 4 infants and 10 adults with gonorrheal ophthalmia there was no evidence of a mixed inclusion infection. In three cases the infection was monocular at birth but became bilateral within six days or more.

Of 2170 newborn infants treated by the Crede method of prophylaxis (the instillation of a 1 per cent solution of silver nitrate at birth repeated after four hours) only 1 developed gonorrheal ophthalmia and in this infant the condition was unilateral.

Inclusion blennorrhoea may heal without gross scarring. Aust found that scarring occurred only in cases in which pseudomembranes formed, and apparently was the result of the intense inflammatory process rather than the action of a chronic scar-producing agent such as is present in trachoma.

The communicability of the disease is slight. In many of the reviewed cases there was no history of

contact. In the mild epidemics from infection in swimming pools direct transfer has been rare.

The disease usually appears as a follicular conjunctivitis of acute or subacute onset, but papillary hypertrophy sometimes predominates. The incubation period is approximately seven days. The duration of the condition is usually from three to six months. It is never less than one month and rarely more than a year. The disease is often confused with trachoma, but differs from the latter clinically by the predominant involvement of the lower lid and the absence of pannus and cicatrices.

The clinical differences between the infection in infants and in adults seem to be due to diminished susceptibility of the conjunctiva of the adult.

The papillary type usually begins in an acute form with swelling of the preauricular gland on the involved side. In the reviewed cases minute hemorrhages of the conjunctiva were common, there was much secretion, and inclusions were usually numerous.

Follicular conjunctivitis was characterized by a subacute onset scanty secretion, and follicular hypertrophy and infiltration of the conjunctiva, particularly of the lower cul de sac. Preauricular adenopathy was common.

Superficial punctate keratitis was observed in 1 of each type of case, and pseudoptosis was evident in all cases of monocular infection.

The principal subjective symptoms were blurring of vision due to the secretion, and photophobia. There was no itching. In 4 cases healing seemed to be complete and the conjunctiva and cornea appeared to have returned to normal at the end of the period of study.

One of the reviewed cases was that of a surgeon in whom the infection developed following an operation for dilatation and curettage in which blood spurted into the eye. The clinical course was typical of papillary inclusion conjunctivitis.

The bacteriological findings in all of the cases were essentially negative, only *Clostridium verosus* and *Staphylococcus albus* being commonly found. In 2 cases slightly hemolytic *Staphylococci* were seen, but were not numerous. In 1 case there was a temporary secondary infection with *Influenza bacilli*.

The demonstration of inclusion bodies was more difficult than in cases of inclusion blennorrhoea. Free elementary and initial bodies were never numerous. Typical inclusions were found more easily in the papillary type than in the follicular type.

In 7 cases treatment with silver nitrate and oxy-cyanide of mercury failed to shorten the course of the disease. In 1 case the condition was treated for a month without noticeable effect with each of several drugs, and the disease was still active at the end of a year. In 2 cases in which no treatment was given healing occurred in two months.

According to Morax, the essential lesion is a diffuse subepithelial infiltration with leucocytes, principally mononuclear. The epithelium is infiltrated with leucocytes and undergoes mild proliferation or par-

tial desquamation. The lymphatic cells have a tendency to group themselves in masses in which vascular networks develop. Healing occurs without the formation of scars. Numerous characteristic follicles with avascular centers composed of large mononuclear cells surrounded by plasma cells and lymphocytes are seen.

The authors discuss the differential diagnosis of inclusion conjunctivitis including trachoma and acute follicular conjunctivitis of the Béal type.

In the epidemic form of inclusion conjunctivitis, the transmission of the infection probably occurs by way of the water in a swimming pool. The source of the infection may be either the secretion from an infected eye or infected genital secretion. In isolated cases in which the swimming pool can be eliminated as the source of the infection, the virus must pass from eye to eye or from the genito-urinary tract to the eye. The latter is the more probable.

In 1884 Kröner advanced the hypothesis that blennorrhoea of the newborn in which the gonococcus is not present is caused by an unknown agent, the primary site of which is the birth canal of the mother. The demonstration of inclusion bodies in cases of non-gonococcal urethritis in men (Lindner) and of urethritis in women (Halberstaedter and Prowazek) indicated the probable source of the infection in the baby. The disease was produced in the eyes of baboons with secretions obtained in cases of urethritis in men in which the gonococcus was absent and with secretions from the vagina of mothers whose babies had inclusion blennorrhoea. Heymann was able to transmit the infection to monkeys. Inclusion bodies have been found in epithelial cells from the cervix and in secretions from the vagina. In 2 cases free elementary bodies were observed in enormous numbers in smears from the cervix, a finding of significance with regard to the epidemiology of swimming pool conjunctivitis and suggesting localization of the virus in the cervix. The infection appears to have little if any gynecological importance although it may be a minor cause of leucorrhea. A case of inclusion urethritis in a man indicating transmission by sexual intercourse is reported.

The morphological and staining characteristics of inclusion virus are described and various experimental observations are discussed. When sufficient knowledge of viruses has been obtained to permit a systematic classification it is probable that inclusion virus will be grouped with the viruses of trachoma and psittacosis and possibly with those of vaccinia variola and fowlpox all of which have elementary virus granules. The close relationship between the viruses and rickettsia has long been recognized. At present the genus rickettsia is limited to a group of minute intracellular bacteria which have a blood sucking arthropod as one of their hosts. Whether this definition should be modified to include the type of organism seen in inclusion conjunctivitis and psittacosis is a subject for discussion.

Inclusion conjunctivitis confers no immunity. This is evidenced by the lack of neutralizing anti-

bodies or agglutinins for the elementary bodies. There is no permanent local immunity, and previous infection with trachoma virus does not confer immunity to infection with inclusion virus.

LEONARD S. PLATT, M.D.

Rycroft B. W. The Surgery of Corneal Grafts
Lancet 1936 230 239

After briefly reviewing the history of corneal grafting and the various techniques that have been used, Rycroft describes in detail his own procedure. The latter is as follows:

A general investigation of the host and donor is made: gross focal sepsis removed and general disease eliminated. The Wassermann reaction of the donor must be negative. There must have been no active disease in the eyes for at least a year before the keratoplasty is undertaken. The usual preliminary precautions are taken to ensure patency of the lacrimal ducts and sterility of the conjunctival sac. There must be no severe cough or prostatic obstruction. Preliminary treatment consisting of irrigations with a 1:8,000 solution of mercuric oxyvanilate at intervals of four hours and local ultraviolet irradiation with the full spectrum of the mercury vapor lamp for three minutes daily is carried out for a week. The projection of the eye is accurately measured. The response must be brisk. Retroillumination is used to determine the position of the pupil and the presence or absence of gross lens opacities. This is of importance in determining the site for the graft. On the day before the operation the state of the bowels is attended to in the usual way, and atropine is instilled at night into the eye of the host. Rycroft has given up the use of miotics. On the morning of the operation $7\frac{1}{2}$ gr. of medinal are given one hour before the time of the operation. The patient is operated upon in bed.

The preparation of the site in the host and the enucleation of the donor's eye are begun simultaneously. Facial akinesis by the method of O'Brien is a routine procedure. In the host a complete flap is formed by incising around the limbus and is then separated well back to the equator of the globe. Next a pursestring suture of black silk is inserted close to the edge of the conjunctiva in such a way as to render the aperture eccentric when the suture is tightened. A 4 mm. circular graft is outlined over the precise site of the pupillary aperture which has been determined previously and may have been marked on the nebula with methylene blue (Elschnig), and the whole thickness of the cornea is cut through. During these maneuvers the eye is constantly irrigated with normal saline solution at body temperature and when the graft is cut through in one portion the aqueous is slowly evacuated. The section is completed with the scissors and a fine protected forceps. The same procedure is carried out on the enucleated eye with the use of Thomas's apparatus to hold the globe.

The graft is then transferred to normal saline solution at body temperature and from there to the

bed by means of a lens spoon, care being exercised to see that it is not turned upside down. It is maneuvered into position by means of the iris retractor, the assistant at the same time gradually tightening the pursestring suture so that the graft gradually disappears from view as the conjunctiva closes over it. When the conjunctiva is tied off and allowed to fall back the graft is held securely in position by the natural strap over the cornea. No suture touches the graft as the latter is entirely covered by conjunctiva. The upper lid is fixed to the cheek with a retention stitch, and the routine treatment which is employed following operations for cataract is given.

The eye is not dressed for three days. At the end of that time the graft usually appears opaque and can be seen dimly through the widening conjunctival aperture. At the end of the first week more of the graft is visible and it is slowly beginning to clear. After from ten to fourteen days the stitch either cuts out or is removed and the conjunctiva slides back. Atropine mydriasis is continued from the first dressing. It is of importance to keep the patient in bed for at least a month as the linear scar is weak and there is a tendency toward prolapse if the patient attempts too much.

The indications for the grafting of a cornea are clearly defined:

1. There must be reduction of vision by a corneal scar to perception of hand movements.
2. Uveal tissue must not adhere to the scar. It must be separated off before the grafting is undertaken.
3. The pupillary aperture must be bright and mobile by retroillumination although successful cases of graft have subsequently had a cataract removed.
4. Glaucoma must be absent.
5. The projection of light must be accurate and brisk.
6. There must be absence of disease in the host and of syphilis in the donor.

Operative complications consist of prolapse of the iris, difficulty of fixation of the graft, sepsis (rare), and opacification of the graft.

LESLIE L. MCCOY, M.D.

Cowan A. Congenital and Familial Cysts and Flocculi of the Iris. *Am J Ophth* 1936 19 287

Cowan reports four cases of congenital and familial cysts of the retinal pigment layer of the iris. The cysts were bilateral. They consisted of pigmented masses and pouches filled with fluid which projected from the posterior layers of the iris through the pupil and into the anterior chamber. They filled and emptied. The four patients were related but there was no consanguinity. One patient was mentally deficient, had had chorea, and came to the clinic because of a divergent strabismus. The findings of physical examinations were negative and there was no history nor evidence of injury.

VIRGIL WESCOTT, M.D.

Walsh, F. B., and Sloan, L. L. Idiopathic Flat Detachment of the Macula. *Am J Ophth*, 1936, 19: 193.

Idiopathic flat detachment of the macula is characterized by unilateral dimness of vision with a positive scotoma, morphopsia, and micropsia. The onset is usually sudden. Ophthalmoscopic examination reveals a macular change suggestive of early choroiditis. With the aid of the binocular ophthalmoscope, this is seen to be a definite swelling in the macular region from 3 to 4 disk diameters in area with a few small yellow spots in the retina. The acquired transient hyperopia is probably due to the swelling. There is a central scotoma which may be absolute for small colored test objects. The condition is self limited and of unknown causation. Recovery takes place in from two to four months, and is usually quite complete although in some of the cases the micropsia and changes in the light sense may remain. There is some tendency toward recurrence.

The authors report three cases and present fundus photographs which show the typical appearance of the lesion and the various stages of recovery.

The condition has been designated by others by such terms as "central chorioretinitis," "central retinitis," "macular edema," and "preretinal edema."

The authors believe that there is a separation of the retina in the macular region. They base this opinion on the bending forward of the blood vessels at the margins of the affected area, the reduplication of the beam with the Friedmann ophthalmoscope and the temporary hyperopia.

WILLIAM A. MANN, JR. M.D.

Coston, T. O. Primary Tumor of the Optic Nerve with the Report of a Case. *Arch Ophth*, 1936, 15: 696.

Primary tumor of the optic nerve is infrequent. Only a few more than 300 cases have been reported in the literature. Intraneural tumors usually classified as gliomas occur in from 60 to 75 per cent of cases in the first decade of life, while tumors of the nerve sheaths, most of which are endotheliomas or meningiomas, are most common after the thirtieth year of age. Fibromas, also of nerve sheath origin, constitute only about 3 per cent of tumors of the optic nerve and are usually found in the early years of life.

The case reported is of interest because of the extension of the tumor, a dural endothelioma of the optic nerve, to the disk. Adjacent to the edematous disk on the temporal side and definitely connected to it were 2 elevated grayish nodules. The condition is shown by a photograph of the fundus. The patient, who was forty eight years of age, had complained of loss of vision and proptosis for nearly twenty years. At operation, the globe, tumor and intra-orbital portion of the optic nerve were removed by a modified Lagrange incision. There was no serious postoperative complication. Today one

year after the operation, the patient is in good condition.

Pathological examination of the specimen confirmed the diagnosis. The tumor completely surrounded the optic nerve which had been compressed into a narrow cord and was completely atrophic.

WILLIAM A. MANN, JR. M.D.

NOSE AND SINUSES

Kasper, K. A. Nasofrontal Connections. A Study Based on 100 Consecutive Dissections. *Arch Otolaryngol* 1936 23: 322.

The author states that for correct interpretation of the anatomy of the nasofrontal connections in the adult simultaneous study of dissections from adults and fetuses is necessary.

In his study of 100 adult nasofrontal connections, the frontal sinus or sinuses were found to develop in the following ways: (1) in 57 per cent, by expansion of a frontal anterior ethmoidal cell or cells in the frontal recess; (2) in 34 per cent, by expansion of an infundibular anterior ethmoidal cell or cells in the ethmoidal infundibulum; (3) in 4 per cent, by direct expansion of the ethmoidal infundibulum; (4) in 3 per cent, by direct extension of the frontal recess; and (5) in 2 per cent, by expansion of a cell or furrow in the suprabullar region.

The foregoing figures show that in 62 per cent of cases (Groups 1, 4 and 5) the nasofrontal connection is not directly related anatomically to the ethmoidal infundibulum. In 57 per cent it has its genesis in a frontal pit or furrow; in 3 per cent it is a direct ex-

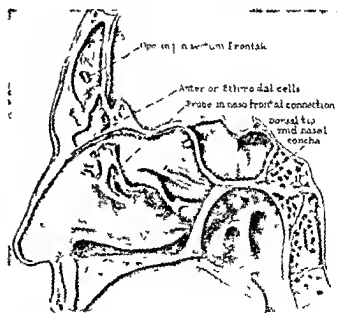


Fig. 1. Dissection from an adult. Note the nasofrontal connection in direct anatomical continuity with the ethmoidal infundibulum. The early frontal pits have remained quiescent. The septum frontale is extremely thin and presents a large natural opening between the right and the left frontal sinus.

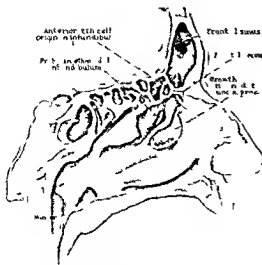


Fig. 2 Dissection of an adult lateral nasal wall. Note that the frontal sinus is formed by a direct extension of the entire frontal recess. The distortion of the frontal recess is due to an expansion of an infundibular anterior ethmoidal cell.

tension of the frontal recess and in 2 per cent it grows from a suprabullar cell.

In 38 per cent of cases (Groups 2 and 3) there is a fairly direct relationship between the nasofrontal connections and the ethmoidal infundibulum. In deed in 4 per cent of cases the ethmoidal infundibulum and the frontal sinus are in direct anatomical continuity. In the remaining 34 per cent an infundibular anterior ethmoidal cell located in the ventral portion of the ethmoidal infundibulum appears to be responsible for the origin of the frontal sinus.

JAMES C. BRASWELL, M.D.

NECK

Montgomery M. L. Lingual Thyroid. A Comprehensive Review. *West J. Surg. Obst. & Gynec.* 1935, 43: 665-1936, 44: 54, 122, 189.

By the term "lingual thyroid" the author refers to thyroid tissue occurring at the base of the tongue. A very rare form—of which only 2 cases have been recorded—as that in which thyroid tissue is found in the body of the tongue. The first authentic case of lingual thyroid was reported in 1888, by Bernays. Dore discussed the subject in 1922.

Before reviewing the cases recorded to date Montgomery reports a case of his own. In childhood his patient had suffered from hypothyroidism. The tumor which was probably a compensatory growth appeared when she was nineteen years of age. During her pregnancies it enlarged. Thyroiditis resulted from a necrosing injection. Iodine therapy caused a variation in the size of the mass. The thyroid tumor was subjected to biopsy.

In the literature Montgomery has found the records of 144 apparently authentic cases of lingual thyroid. He read the original records of all except 1 case. He summarizes the cases in tables. The chief symptoms were dysphagia and dysphonia. Less frequent were dyspnea, pain and hemorrhage. Hyperthyroidism occurred occasionally. Thyroid insufficiency was noted in 21 cases. Montgomery discusses the relationships of lingual thyroid to ovarian function and describes the physical findings in cases of benign tumor. Autopsies, operations and careful clinical examinations have shown that in from two thirds to three fourths of cases of symptom producing lingual thyroid there is no thyroid in the normal location in the neck.

In conclusion Montgomery describes the histological findings in 94 benign lingual thyroid nodules. These nodules showed the usual changes found in the thyroid in the neck.

PAUL STARR, M.D.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS, CRANIAL NERVES

Skoog T. Studies of a Material of Head Injuries from the Surgical Clinic in Lund with Special Reference to Temporal Bone Involvement. *Acta chirurg Scand* 1936 77 383

The author reviews 794 injuries of the skull treated in the Surgical Clinic of the University of Lund, Sweden in the ten year period from 1924 to 1933. In 370 of the cases there was a verified fracture. After presenting a general survey of the cases, Skoog discusses in detail the cranial fractures involving the temporal bone. He states that the diagnosis of such fractures is facilitated by X-ray examination much more today than formerly. In 1933 the incidence of negative roentgen findings in cases of clinically diagnosed or suspected fractures of the temporal bone was much lower than in 1924. However, the diagnosis can be made with most certainty from the findings of anatomical and functional otological examinations.

In 38.9 per cent of the reviewed cases of fracture involvement of the temporal bone and ear was found. The author describes the different types of temporal bone fracture in detail and discusses their symptoms, prognosis and treatment. In the Surgical Clinic of the University of Lund uncomplicated cases are treated conservatively with careful attention to the condition of the cerebrospinal fluid. At the first sign of meningitis operation is recommended. As a rule operation is limited to chiseling of the mastoid process and exposure of the involved dura. Only in very exceptional cases is a radical operation performed.

In 94 cases of fracture of the temporal bone, including 90 of pyramidolongitudinal fractures and 4 pyramidotransverse fractures a particularly detailed functional otological examination was made. In all of the 4 cases of pyramidotransverse fractures cochlear and vestibular function was destroyed. In 3 of them there was a spontaneous nystagmus toward the unaffected side. In 1 case the presence of nystagmus was uncertain but the findings of roentgen examination indicated that the fracture had involved the labyrinth. Facial palsy occurred in only 1 of the cases and showed a tendency to decrease while the patient was in the hospital. In all except 2 of the 90 cases of pyramidolongitudinal fracture there were disturbances of both the middle and the internal ear but disturbances of the middle ear predominated. In 43.3 per cent there were also vestibular disturbances.

On the basis of this material the author concludes that involvement of the temporal bone in cranial trauma is not associated with any greater tendency toward disturbances in the vestibular area than are

fractures at other sites or cranial traumas without fracture.

De Martel T., Guillaume J., and Thurel, R. Cerebral Pseudotumors from Blocking of the Subarachnoid and Ventricular Cavities (Pseudotumeurs cérébrales par cloisonnements des cavités sous arachnoïdienne et ventriculaires). *Presse méd.*, Par 1936 44 563

The authors state that the subarachnoid space may be blocked by a pericerebral serous leptomeningitis. In their cases this leptomeningitis has usually been of a circumscribed unilateral type. Under such conditions the chief symptoms are headache, Jacksonian epilepsy, and parietic symptoms. The headache is chiefly unilateral and occurs in attacks of varying severity which are sometimes accompanied by vomiting. The epilepsy of the Jacksonian type usually extends at first to half of the body but later may become generalized. The crises occur very irregularly, sometimes at considerable intervals and sometimes frequently. The parietic symptoms may include facial paralysis, brachial monoplegia or hemiplegia with brachio-facial involvement predominating. Sensory symptoms are slight. There are no, or only slight, signs of intracranial hypertension. The diagnosis must be made by encephalography with the lumbar injection of from 30 to 40 c. cm. of air. This method makes it possible to exclude the presence of a tumor and shows that the air does not occupy the entire subarachnoid space affected. The condition is best treated surgically by draining off the collections of serous fluid. This usually relieves the symptoms. While the Jacksonian crises may recur because of persistent cicatricial lesions, even those of a minor nature they will be less severe.

Blocking of the foramen of Monro by a similar pathological process is demonstrated on encephalography by failure of one lateral ventricle to fill with air. This condition is sometimes demonstrable in cases of epilepsy. Blocking of the subarachnoid spaces of the posterior cerebral fossa, of the foramen of Magendie, or of the aqueduct of Sylvius may cause severe symptoms as it prevents the normal outflow of the ventricular fluid and produces an internal hydrocephalus. Some of the symptoms resemble those of tumor of the cerebral fossa, being caused by increased intracranial pressure. Others are due to the site of the lesion. The chief symptoms are occipital headache, vomiting, vertigo, disturbances of equilibrium and bilateral choked disk (indicating a marked degree of intracranial hypertension). With the exception of the oculomotor nerve the cranial nerves are usually not involved. These conditions are best diagnosed and the site of

the block is best determined by ventriculography with insufflation of air directly into the ventricles, a procedure which makes it possible also to exclude tumor of the posterior cerebral fossa. Lumbar puncture is of no value for diagnosis and is definitely contra indicated. The operative procedure indicated depends upon the site of the block. Its aim must be to restore the normal flow of the cerebrospinal fluid. Preliminary ventricular puncture should be done if the hydrocephalus is marked.

Optic chiasmal arachnoiditis *per se* is not responsible for the serious visual disturbances that have sometimes been attributed to it. Marked loss of vision occurs only when the inflammatory process extends to the chiasm and the optic nerve. If there is no improvement under medical treatment, an operation to liberate the optic nerve from the surrounding inflammatory tissue is justified. Surgical exploration of the optic chiasmal region is not dangerous if a sound is placed in the lateral ventricle so that fluid may be drained off during and after the operation in case a hypertensive reaction occurs.

ALICE M. MEYERS

Courville C. B. Multiple Primary Tumors of the Brain. A Review of the Literature and a Report of Twenty One Cases. *Am J Cancer* 1936 26 703

The types and combinations of multiple intracranial tumors are varied. In most cases the development of tumors from a separate tissues is largely a matter of chance. On the other hand there are records of a number of cases of multiple tumors of the meninges (meningiomas), the nerve roots (central neurofibromatosis) and the brain (gliomas) which suggest a predisposition to the formation of multiple growths.

The incidence of multiple gliomas in a series of autopsies is about 15/1000. Such tumors constitute 4.3 per cent of intracranial neoplasms in general. In the author's series they constituted about 8 per cent of gliomas. About 10 per cent of multiform glioblastomas are multiple whereas only 6 per cent of astrocytomas found at autopsy are multiple.

In a review of the literature the author found reports of 113 apparently authentic cases of multiple gliomas in which the essential pathological findings were recorded. To these he adds 21 cases which have come under his own observation.

In most of the cases cerebral hemispheres were the site of the multiple tumors. The individual tumors vary considerably in size, degree of invasiveness, and the nature and degree of regressive changes. In a given case there may be tumors of different sizes suggesting either a difference in their degree of malignancy or in their time of genesis. Solid hemorrhagic and cystic tumors may be found associated.

In the majority of cases the tumors are multiform glioblastomas. Multiple astrocytomas and other types are much less frequent. In the author's series, multiple astrocytomas were found only in the cerebellum (vermis and lobes) and thalamus. It is pos-

sible that gliomas of other types, such as gangliomas may also be multiple.

The only logical explanation for widespread tumors is the development of multiple independent foci. In cases presenting small satellite tumors about a larger growth it is possible that the large tumor may "infect" or stimulate the development of the smaller foci (discontinuous growth). The distribution of the tumors and the arrangement of the anatomical structures seems to exclude the possibility of metastasis by way of arterial or venous channels, perivascular channels or the cerebrospinal fluid.

JOSEPH K. NARAT, M.D.

Caporale L. and De Bernardis M. Heteroplasties of the Dura with Laminated Catgut (Sur les hétéroplasties durales avec le catgut laminé). *Rev de chir* 1936 55 70

After reviewing the subject of plastic operations for injuries of the skull and brain, the authors report experiments they carried out on rabbits in which after the removal of pieces from the dura and of fragments from the brain, thin layers of catgut washed several times in warm physiological salt solution and of a size sufficient to extend about 5 mm beyond the borders of the wound were pushed under the edges of the defect in the dura and into immediate contact with the cerebral wound. Twelve rabbits were operated upon in this manner. In four of them inflammation resulted and caused death on the eighth, twelfth, fifteenth and eighteenth post-operative day respectively. The surviving animals were killed after periods of from six to twelve months. The histological findings are described in detail and shown by photomicrographs.

The brain scar was soft and gray, completely isolated by the plastic membrane. There were no adhesions to the dura or skull. The layers of catgut still persisted. No signs of small cell infiltration or an inflammatory reaction were found.

The use of thin layers of catgut protects the brain from the formation of the hard rigid scars which result when the skull and dura are injured and the dura is not repaired in some such fashion. When the dura shows no loss of substance and can be completely reconstructed, and when the brain substance is not injured such a plastic procedure is unnecessary but when there is an injury of the brain substance or a defect in the dura the use of a non-irritating plastic substance is very valuable in the formation and guidance of the cells newly formed after the injury and in protecting the brain from the formation of rigid scars which exert pressure on the cerebral tissue.

AUDREY GOSS MORGAN, M.D.

Harris W. Gliary Neuralgia and Its Treatment. *Brit M J* 1936, 1 457

In an article published in 1926 Harris reported seven cases of migrainous neuralgia with pain in or around the eyeball, some of which showed marked congestion of the conjunctiva with lachrymation. In six cases, injection of the infra orbital nerve gave

relief. In this article sixteen additional cases are reported. Alcohol injection of the gasserian ganglion resulted in apparently lasting cure.

The term "migrainous neuralgia" is applied by Harris to recurrent and usually unilateral neuralgia of the temple or the side of the forehead and jaw. The attacks vary in frequency, the rapidity of their onset, and their duration. They usually last for from ten to thirty minutes. Nausea occurs occasionally, but vomiting is rare. Visual spectra and transient hemianopia are never present. When the eyeball itself is prominently affected by the pain Harris calls the condition "clary neuralgia." There is often a history of migraine in the patient or his family. Harris considers the condition an anterior migraine affecting the dural meningeal vessels instead of the posterior cerebral branches, with reference of the pain through the recurrent meningeal branches of the fifth nerve. The relief obtained from nerve injection is explainable on this basis.

Attacks of trigeminal tic are shorter than those of migrainous neuralgia, lasting only a few seconds or a minute or two. They differ from the latter also in the fact that they can be provoked by stimulation of trigger zones. The "points de Valleux" are not diagnostic of tic.

Chronic neuralgia of the jaws is a more persistent type of pain which sometimes radiates from the face to the side of the head and into the neck and shoulder. It is most common in women and probably has a strong hysterical element. Alcohol injection is to be avoided in this condition.

Harris presents a classification of hemicrania in which the atypical neuralgias are divided into four groups according to the apparent cause. He then describes the type of treatment giving relief.

Clary neuralgia has been known to occur at all ages up to seventy-two years, but is most frequent between the fortieth and fiftieth years. The redness, congestion, and lachrymation of the eye at the time of an ocular crisis may lead to a diagnosis of iritis, orbital abscess, or acute conjunctivitis, but the recurrence of the attacks should suggest the nature of the condition. After ganglion injection or root section the cornea loses sensation. Therefore care must be taken to prevent keratitis and panophthalmitis, which may occur without pain.

Other conditions about the eye which must be ruled out in the differential diagnosis are glaucoma, trigeminal tic, herpes frontalis and leaking aneurism of the circle of Willis.

EDWARD S. PLATT, M.D.

Canton, J., and LaFargue, P. *The Surgical Treatment of Facial Neuralgia* (*Le traitement chirurgical de la névralgie faciale*). *Bordeaux chir.* 1936, pp. 1, 153.

This is a complete review of the subject of major trifacial neuralgia. A brief historical sketch is followed by a discussion of the various types of neuralgia of the face and the importance of the differential diagnosis between major and minor trigeminal neuralgia. For major trigeminal neu-

ralgia there is only one treatment, namely, destruction of the nerve by injections of alcohol or mechanical section. The authors review the various routes and methods used for alcohol injection, but do not describe them in detail. They state that as such injections are relatively benign and minor procedures they should be tried before operation in all except severe cases with involvement of all three divisions of the nerve. However, their effects are usually temporary and often unsatisfactory. Nearly always, operation is required eventually.

For the operative treatment of facial neuralgia most French surgeons prefer anesthesia induced by the rectal injection of oil ether, whereas American surgeons seem to prefer local anesthesia or avertin plus inhalation anesthesia.

The authors review in some detail the history of operative division of the fifth nerve, citing especially the pioneer attempts of Horsley, Kocher, and Rose. The earlier dangerous procedure of avulsion of the gasserian ganglion had a mortality of approximately 15 per cent. This procedure was superseded by division of the posterior root, which may be accomplished by either the extradural temporal or the intradural cerebellar route.

The steps in the temporal approach are described in detail. The various incisions and methods of controlling hemorrhage from the middle meningeal artery are discussed, but the authors do not express their preference. They believe that except under unusual circumstances complete division of the posterior root should be done as partial division is somewhat uncertain and is followed by a high incidence of recurrence requiring a second intervention.

In discussing the keratitis which may follow operation, the authors designate the condition by the term "neuroparalytic ocular syndrome." They state that as trauma to the gasserian ganglion is nearly always followed by keratitis they recommend division of the posterior root as far behind the ganglion as possible.

According to Hartmann, the keratitis is of the following types:

1. Serous keratitis secondary to a disturbance in the gasserian ganglion due to the operation.
2. Lagophthalmic keratitis due to failure of closure of the lids following the operation.
3. Traumatic keratitis due to corneal anesthesia.
4. Keratitis not related to any of these mechanisms which presents the characteristics of a trophic disturbance and may possibly be due to trauma to the ganglion.

After careful study of many cases, De Martel developed the following classification:

1. Infectious keratitis—not an ordinary infection, but due to the filterable herpetic virus.
2. Vasomotor keratitis due to sympathetic disturbances.
3. Trophic keratitis due to trauma or irritation of the gasserian ganglion.

The second part of the article is devoted to a consideration of the intracranial cerebellar route

first used by Dandy in 1925. Ramonede described such an approach on the basis of work on cadavers in 1903 but never used it clinically. The authors describe the steps of the operation performed by Dandy.

From the reports of Dandy, twenty five operations performed by Petit Dutaillis and ten operations performed by Van Wageningen by the cerebellar route, they come to the conclusion that the mortality following the use of this route is about the same as that following the use of the temporal route, viz. about 2 per cent. The incidence of the neuromyotonic ocular syndrome is much less following the use of the cerebellar route, probably because the ganglion is less disturbed. In about 8 per cent of the reviewed cases the use of this route disclosed a tumor of the posterior fossa which would not have been discovered by the temporal approach. It is easier to preserve the motor root by the cerebellar approach.

I though the authors seem to have had no personal experience with the cerebellar approach they conclude that it is destined to supersede the temporal approach.

MAN M. ZIMMERMAN, M.D.

SPINAL CORD AND ITS COVERINGS

Hrazier, G. H. and Rowe, S. N. The Surgical Treatment of Syringomyelia. *Ann Surg.* 1936, 103: 481.

Syringomyelia may be treated by irradiation or surgical drainage. However irradiation is considered to affect only gliosis and consequently is believed to be of little value in the presence of cavitation. A combination of the two methods may ultimately prove best.

In the drainage treatment the authors perform a vertical chordotomy in the midline or a few millimeters lateral to it on the side of the greatest cord damage as indicated by the clinical picture and establish permanent drainage by the use of a gutta percha drain held in place by a silver clip. If after the initial drainage the clinical course suggests closure of the incision into the syringomyelic cavity, a second operation is performed. Of sixteen patients treated by this method and remaining under observation for a year or more, 50 per cent were sufficiently benefited to return to their former occupations.

In the discussion of this report, MYSTER said that he opens the cavity longitudinally and then sutures its lining membrane to the arachnoid on either side thus forming a lozenge shaped opening which may remain open.

DAVID J. IMPASTATO, M.D.

Liedberg, N. The Clinical Aspects and the Treatment of Spinal Cord Tumors. (Zur Frage der Klinik und Therapie der Rückenmarkstumoren). *Acta chirurg. Scand.* 1936, 71: 452.

This is a report on twenty nine cases in which laminectomy was done at the Surgical Clinic in Lund during the twenty year period from 1913 to 1932 on

the basis of a positive or probable diagnosis of spinal cord tumor. In four of these cases neither a tumor nor any other pathological change was found. In three cases there was a metastatic tumor in one case, a primary extradural tumor (sarcoma) and in four cases an inoperable intramedullary process. In seventeen cases an intradural extramedullary tumor was found and removed by operation at the diagnosed level. Seven of the neoplasms in these cases were meningiomas, seven neuroinomas, and three tumors of other histological structure.

The author discusses the seventeen cases from the diagnostic, pathologic, anatomical and therapeutic standpoints, and then briefly reviews the primary operative results and the late results. Two of the patients died soon after the operation. In one case a recurrence developed and in two cases despite an apparently radical operation no favorable effect was obtained. In a case of caudal tumor, the operation was followed by only partial recovery. In the eleven other cases, in which a subdural extramedullary tumor was radically removed, re-examination from two and a half to twenty years after the operation showed practically complete recovery.

PERIPHERAL NERVES

Di Molfetta, A. A Case of Paralysis of the Upper Roots of the Brachial Plexus of the Duchenne Erb Type Following the Prophylactic Injection of Antitetanus Serum. (Sopra un caso di paralisi radicolare superiore—tipo Duchenne Erb—del plesso brachiale da iniezione profilattica di siero antitetanico). *Arch. ital. di chir.* 1936, 42: 24.

The case reported was that of a laborer who sustained a lacerated and contused wound of the leg and developed paralysis of the deltoid, supraspinatus and infraspinatus muscles five days after the prophylactic administration of antitetanus serum. The complication followed the usual course of the paralysis developing after lacerating pains in the shoulder which began during an intense anaphylactic reaction. The amyotrophy progressed rapidly, and the reaction of degeneration was complete. However sensory involvement was absent. There has been slight improvement in the course of a year.

The author reviews the history of paralysis following serotherapy and presents a list of articles published since the comprehensive report of Croizson and Christophe in 1931. Between 50 and 100 cases due to antitetanus serum have been recorded. The condition has developed also after the use of other sera, particularly diphtheria antitoxin. It has been studied especially in France where the first case was reported in 1910.

Di Molfetta discusses the classification of the visceral and neurological complications of antitetanus serotherapy, the clinical pictures, topographical diagnosis and probable pathological characteristics of peripheral nerve lesions and the hypotheses advanced to explain the peculiar vulnerability of the brachial plexus.

He cautions against the prophylactic use of anti tetanus serum when it is not definitely indicated. The preliminary intravenous injection of sodium carbonate is scarcely practicable in everyday practice.

In at least 1 case an insurance company has refused compensation for paralysis due to the prophylactic use of antitetanus serum on the ground that the injection was a facultative precaution against a potential danger and not a treatment demanded by the injury itself. The author states that this stand is entirely indefensible, and full compensation should be given.

M. E. MORSE, M.D.

SYMPATHETIC NERVES

Frost, T. T., and Wolpaw, S. E. An Intrathoracic Sympathoblastoma Producing the Symptoms of a Superior Pulmonary Sulcus Tumor (Pancoast). *Am J Cancer*, 1936, 26: 483.

The authors report a case of intrathoracic sympathoblastoma producing the symptoms of superior pulmonary sulcus tumor that were described by Pancoast. The syndrome as originally described, consisted of (1) pain about the shoulder high in the axilla or down the inner side of the arm or on the ulna side of the forearm, (2) Horner's syndrome, (3) loss of power and wasting of the muscles of the hand,

and (4) X ray evidence of a small, homogeneous shadow at the apex of the lung with destruction of the posterior parts of one or more ribs and often of the adjacent vertebrae. It has been suggested that this characteristic picture is that of a definite pathological entity, an epithelial tumor.

The authors' patient was a man thirty eight years old who complained of pain in the right arm of four months' duration and gave a history of chancre years previously. Roentgenograms of the chest disclosed a tumor in the right apex, extending to the level of the first rib and causing displacement of the esophagus and trachea to the left and anteriorly. A tentative clinical diagnosis of mediastinal tumor with invasion of the brachial plexus on the right and extension into the spinal canal and tertiary syphilis was made. Deep X ray therapy was discontinued because of the patient's extremely poor condition. His course was one of gradual decline.

Postmortem examination showed a sympathoblastoma of the superior mediastinum and neck with extensive invasion and numerous metastases.

From this case and a review of the literature the authors conclude that the clinical syndrome described as that of a 'superior pulmonary sulcus tumor' cannot be attributed to a specific pathological entity as it may be caused by various tumors near the thoracic inlet. ROBERT ZOLLINGER, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Cotte G and Pallot G. A Histological and Experimental Study of Certain Painful Premenstrual Hyperplasias of the Mammary Gland (Étude histologique et expérimentale de certaines hyperplasies mammaires prémenstruelles douloureuses) *Gynec et obst*, 1936 33 273

In some women the breasts become painful about ten days before menstruation. The pain stops as soon as the flow begins and recurs after about three weeks. Some of these women have a pathological condition of the breast such as chronic mastitis, adenofibroma or Reclus disease but the majority do not. Even if the breast is somewhat swollen and hard during the painful period it usually becomes absolutely normal again when the pain stops. The condition differs in this respect from the chronic induration described by Velpeau and the engorgement of the breast described by Lecene and Lenormand.

Biopsies on such painful breasts have shown that they differ very little from the normal premenstrual breast. Histological examination discloses only an increased degree of growth of epithelium, increased maturation of gland acini and hyperplasia and desquamation of the galactophorous ducts, all of which are physiological processes. The lymphocytosis and thickening of the connective tissue stroma are perhaps pathological but it is possible that they too are functional. There are no signs of inflammation. The histological findings are shown by photomicrographs.

The authors report experiments on rabbits in which they gave folliculin and extract of corpus luteum and studied the effects on the mammary gland. The findings seemed to indicate that the painful condition of the breasts is caused by an exaggeration of physiological processes rather than by a pathological process. It is due apparently to a disturbance of the hormone secretion of the ovary. Hyperfolliculinemia causes hyperplasia of the galactophorous ducts and hyperluteinemia a hyperplasia of the alveoli of the gland accompanied by desquamation of the epithelium. The apparent excess of folliculin or lutein is probably the result of a disturbance of the function of the anterior lobe of the hypophysis. In the majority of cases the pain seems to be due to an excess of lutein and can be relieved by the administration of folliculin. Large doses are not necessary. The authors generally give from 10 to 15 drops twice a day for about fifteen days preceding the menstrual period. If the patient is not relieved the dose may be increased, but first an examination should be made to see whether there is hyperplasia of the galactophorous ducts caused by excessive or too prolonged use of

folliculin. If such hyperplasia is found injections of lutein should be given as extracts of corpus luteum administered by mouth are not effective.

Possibly another factor in the causation of the pain under discussion is the instability of the vagosympathetic nervous system which is frequent in women with such pain. There may be also a special sensitiveness of the gland tissue due to attenuated congenital syphilis or tuberculosis. Repeated attacks of the functional disturbance may finally bring about true pathological changes in the parenchyma resulting in Reclus' disease or even certain types of adenoma of the breast.

AUDREY GOSS MORGAN M D

Virnicchi T. A Case of Intracanalicular Dendritic Epithelioma with Incipient Malignant Degeneration Arising in Cystic Disease of the Breast (Su di un caso di epithelioma dendritico intracanalicolare in incipiente degenerazione maligna insorto su malattia cistica della mammella) *Riv di chir*, 1936 2 109

The patient whose case is reported was a woman fifty-four years old who had long suffered from symptoms of ovarian insufficiency.

Virnicchi discusses the etiology, pathology, and treatment of cystic disease of the breast. He considers it a hyperplastic involutary process stimulated by endocrine (chiefly ovarian) disturbances. He says that it is impossible to state definitely whether it and intracanalicular papilloma are benign or malignant. The case he reports presented no evidence for or against a relationship between the papilloma and the cystic disease but he believes that the same stimulus might easily have determined epithelial proliferation in both situations. Although cystic disease is not definitely a precancerous lesion radical surgical treatment is indicated because any epithelial anomaly may become malignant.

The article is accompanied by photomicrographs and references.

M E MORSE M D

Meland O N. The Place of Interstitial Irradiation in Cancer of the Breast. *Am J Roentgenol* 1936 35 348

The author reports the results of interstitial irradiation from platinum needles containing radium supplemented by preliminary roentgen irradiation. The report covers a six year period. In a large number of the cases no pathological diagnosis was made. In the more recent cases punch biopsies were taken. Some of the punch biopsies were unsatisfactory.

The technique used was the same as that described by Keynes. In this procedure needles are introduced in one or more rows around the breast

and inserted also in the axilla, supraclavicular, infraclavicular, and parasternal regions. However, the author questions the value of inserting needles in the supraclavicular and parasternal regions. The needles are from 3.6 to 4.8 cm in length, have a filtration value of 0.5 mm of platinum, and contain from 1 to 2 mgm of radium. The amount of radium used in a given case depends on the size of the breast, the size of the primary tumor, and the presence or absence of metastasis in the lymph-drainage areas. In the average case, the breast receives from 8,000 to 9,000 mgm-hr and the lymph drainage areas receive 3,500 mgm-hr of irradiation. This is preceded by a course of high voltage roentgen therapy.

Following such treatment the breast undergoes various changes. When the acute effects, such as edema and radiodermatitis, have passed off, it may gradually assume the appearance of a normal breast. Sometimes chronic edema of the skin may persist for a long period. The breast may remain exceedingly tender for a year or more. The skin varies from normal to thick and tanned. The tumor mass recedes gradually, and finally may no longer be palpable. Because of the fibrosis in the axilla the author does not perform a subsequent radical mastectomy. In certain cases, however, he removes a persistent mass by local excision or simple mastectomy. In all of the reviewed cases with ulceration, the breast remained healed whether the patient lived or died subsequently of carcinoma. There was no lymphedema of the arm following the interstitial irradiation.

The author has come to the conclusion that, when possible, patients with large, fat breasts should be treated by roentgen therapy alone or by roentgen therapy and surgery. In inoperable cases, interstitial irradiation combined with surface irradiation should be given. The use of this treatment in operable cases is open to question, but is justified in cases of acute inflammatory carcinoma, the cases of young women, the cases of aged or debilitated women in which an operation is especially hazardous, and the cases of women who refuse to submit to operation.

CARL O LATIMER M.D.

Leddy, E. T., and Desjardins, A. U. The Treatment of Inoperable Recurrent and Metastatic Carcinoma of the Breast. *Am J Roentgenol*, 1936, 35, 371.

In this review the clinical aspects of 573 recurrent, metastatic, and inoperable carcinomas of the breast are considered.

In general, inoperable carcinoma of the breast is best treated by roentgen therapy by the technique of "multiple converging beams." In selected cases this may be combined with buried radium. Of a group of 122 patients, a third of all who were treated were benefited.

Recurrence of carcinoma of the breast is most commonly seen after a non radical operation. The degree of malignancy, as judged by the method of

Broders, is the most important factor determining the probability of recurrence. Second in importance is the thoroughness of surgical operation. Of the cases reviewed by the authors, recurrence had developed in 268. Operable recurrences are best treated by operation supplemented by roentgen therapy. The results of roentgen treatment are in every way equal to those obtained with radium. From the findings of the authors' study it appears that local re appearance of carcinoma in the field of operation is the most favorable form of recurrence, whereas axillary recurrence, in general, has the worst prognosis.

One hundred and thirty two of the 268 patients with recurrence had what Leddy and Desjardins regard as adequate radiotherapy. Of this number, 106 were definitely benefited and 26 had an unfavorable or uncertain result.

The most common site of metastasis in this group of cases was the supraclavicular lymph nodes, which were involved in 316 cases. For the reasons given, the value of radiotherapy for this lesion cannot be stated. Treatment is best carried out with the roentgen rays.

In general, other metastatic lesions, such as involvement of the lung or the liver, respond poorly to treatment.

Metastasis in the other breast is best treated by the method used in the treatment of primary carcinoma of the breast.

Osteous metastasis is the most favorable field for roentgen therapy as improvement can be obtained in more than 80 per cent of the cases.

From this review the authors obtained little evidence indicating superiority of radium or roentgen rays of 200 kv. over roentgen rays of moderate voltage (135 kv.). In fact, in some lesions the latter type of irradiation seemed superior.

The authors regard it as very likely that the incidence of recurrence and metastasis in cases of carcinoma of the breast would be greatly reduced if the frequency of a minor surgical operation as the primary treatment were reduced. They regard radical surgical operation as the method of choice. However, regardless of the method of treatment, it seems that the 2 chief factors determining the prognosis are the index of malignancy of the tumor and the extent of metastatic involvement of the lymph nodes.

Adair, F. E. The Effect of Pre Operative Irradiation in Primary Operable Cancer of the Breast. *Am J Roentgenol*, 1936, 35, 359.

The author discusses the effect of pre operative irradiation in cases of breast cancer in which the disease is limited to the breast or to the breast and axilla, lung metastasis has been ruled out by roentgen examination of the chest, and the possibility of distant metastasis has been ruled out by a careful analysis of the symptoms. He follows the pre-operative irradiation by radical amputation of the breast.

When radical surgery is performed for breast cancer by competent surgeons the incidence of five year cure is 70 per cent in cases in which only the breast is involved and 20 per cent in those in which both the breast and the axilla are affected. In both groups considered together it is 35 per cent. At the Memorial Hospital New York City, the incidence of five year cure in these groups after radical amputation of the breast followed by 2 cycles of high voltage roentgen therapy is respectively 7, 23 and 40.6 per cent. Crediting this increase to the postoperative irradiation the author concludes that irradiation should be of equal if not greater value when given before operation. However in cases so treated the amputation must be delayed for at least two months after the irradiation as the direct killing effect on the more sensitive cancer cells and the development of fibrosis endarteritis and other results of irradiation consume at least eight or ten weeks.

In the author's cases treated by interstitial irradiation and external irradiation without the addition of surgery the incidence of five year cure was only 49 per cent whereas in those treated by surgery alone it was 70 per cent and in those treated by surgery and postoperative irradiation it was 2 per cent.

Two years ago a series of operable carcinomas of the breast were treated by irradiation by the fractional dose method followed two or three months later by radical amputation. Careful microscopic studies were made of the residual cavity or residual cancer. In every case before the irradiation a positive diagnosis of carcinoma was made by aspiration biopsy a method satisfactory to the Memorial Hospital pathologists Fung and Stewart. It requires a pathologist with experience in the examination of irradiated tissue to interpret the gross appearance of the specimen correctly.

Of 11 operable cases of carcinoma of the breast 6 $\frac{1}{2}$ were treated pre-operatively with the 60-kv machine and 2 with the 4 gm radium pack. In all instances the irradiation caused a clinical reduction in the size of the breast tumor. To a lesser extent it reduced also the axillary lesion. The tumor tissue softens and commonly becomes of the same consistency as the mammary tissue.

The patients treated by roentgen irradiation received from 1200 to 1800 r to each of 5 portals. Of those receiving 1200 r per portal complete microscopic disappearance of the cancer occurred in 19 per cent whereas in those receiving 1800 r the incidence of this change was nearly twice as great. External irradiation as delivered by the author's technique is not very successful in curing axillary nodules. The skin of all patients receiving up to 1800 r per portal was in good condition for operation after from four to eight weeks.

The author has found that the administration of 1800 r per portal compares closely in tissue effectiveness with radium pack treatment giving 2400 mc hr per portal. About one half of the patients

treated with the 4 gm radium pack had a persistent radionecrosis. Roentgen irradiation seems definitely superior to irradiation with the radium pack in the treatment of involved axillary glands.

The author advocates sterilization of the ovaries of pregnant women and women under the age of thirty five years who are suffering from carcinoma of the breast.

In conclusion he states that in order to prevent irradiation pneumonitis and secondary anemia every effort should be made to give tangential irradiation so far as is practical.

EARL O LATIMER M D

TRACHEA, LUNGS, AND PLEURA

Binet L Verne J and Courtial J. Experimental Researches on Pneumothorax. A Study of the Collapsed Lung. (*Recherches expérimentales sur le pneumothorax. Étude sur le poumon collabé*). *Presse méd* Par 1936 44 297.

In the study reported the authors attempted to determine the histological and chemical changes that take place in lung tissue following pneumothorax. They injected 30 cc of air into the thoracic cavity of rabbits at first every two days and then every four days after X-ray examination had demonstrated satisfactory collapse. The pneumothorax was maintained over a period of from sixty to ninety days.

Histological examination showed that under the influence of pneumothorax a culture of tissue cells similar to those found in similar tissue *in vitro* is produced. The alveolar spaces are lined with a continuous layer of epithelial cells which may proliferate to such an extent as to make the alveolar structure unrecognizable.

The total lipid content is higher in the atelectatic lung than in the normal lung. This is demonstrated by the higher fat content of the dried tissues and the presence of masses of fat in the vessels of the affected side.

Several photomicrographs are presented to show the various tissue changes.

MARSH WILLIAM POOLE, M D

Russolillo M. A Case of Chondromyxosarcoma of the Lung. (*Sopra un caso di chondromyxosarcoma del polmone*). *Arch di chir* 1936 2 123.

The author reports a chondromyxosarcoma of the lung with metastasis to the iliac bone. In his thirty fourth year, the patient had suffered an attack of acute abdominal pain and fever followed later by a violent cough with the expulsion of purulent sputum. The clinical and roentgen diagnoses were echinococcus cyst of the lung. After the opening and drainage of a cavity, the patient remained apparently well for eight years. At the end of that time the symptoms returned accompanied by dyspnea pain in the chest and rapid deterioration of the general condition. The cavity was again drained but death occurred eight months later.

At autopsy, an enormous unencapsulated tumor with central cavitation was found occupying the greater part of the lung. The cyst wall was formed of cartilaginous and bony plaques embedded in dense fibrous tissue and showed areas of myxomatous degeneration fusiform cell sarcoma, and embryonic mesenchymal tissue in various stages of differentiation into cartilage and bone. The neoplasm had spread locally by means of cartilaginous nodules along the peribronchial veins. Pulmonary chondromas of such a markedly malignant character are unusual. The case was too far advanced for the primary location and histogenesis of the neoplasm to be determined.

Russolillo discusses briefly the bronchoscopic and roentgen diagnoses of chondroma of the lung, and particularly the differential diagnosis of sharply outlined rounded shadows. He gives synopses of two cases (a case recorded by Klages and a case recorded by Moore) which he has found in the literature since Verga's comprehensive report on sixty-one cases in 1932. The cases recorded by Benninghoven and Pierce he excludes as unverified histologically. He has found reports of only five operations for chondroma of the lung. Four of the operations were followed by recovery.

The article contains roentgenograms, photomicrographs and references. M. E. MORSE, M.D.

HEART AND PERICARDIUM

Gilchrist, A. R., Millar, W. G. Paroxysmal Auricular Tachycardia Associated with a Primary Cardiac Tumor. *Edinburgh M J*, 1930, 43: 243.

Primary cardiac neoplasms are very uncommon. In the case reported by the authors the leading clinical features were a state of anxiety, extreme dyspnea, submammary pain, congestive heart failure of mild degree, and an arrhythmic pulse. Electrocardiograms demonstrated auricular extrasystoles and attacks of paroxysmal auricular tachycardia. At post-mortem examination a large myxomatous tumor springing from the left side of the interauricular septum was found.

A review of the literature indicated that, while pulse irregularities are commonly associated with intracavitary tumors, this is the first case in which the disorder of rhythm was demonstrated in the presence of a primary auricular myxoma.

JACOB M. MORA, M.D.

Griswold, R. A. Chronic Cardiac Compression Due to Constricting Pericarditis. *J Am M Ass*, 1936, 106: 1054.

Practical operative attacks on the central circulatory system are limited to the relief of acute or chronic cardiac compression. Constriction of the heart from adhesive pericarditis or Pick's disease falls within the category of chronic compression. The physiological rather than the anatomical or the pathological point of view makes the diagnosis and treatment less difficult. Chronic cardiac com-

pression produces inflow stasis which is characterized by Beck's triad of high venous blood pressure, ascites and a small quiet heart. The author emphasizes the fact that the compressed heart cannot dilate or hypertrophy. Dilatation is prevented by mechanical pressure and hypertrophy by impairment of nutrition due to compression of the coronary vessels.

The case reported was that of a boy seventeen years old who had had dyspnea and rapidly recurring ascites for three months. The heart was small and the apex beat neither visible nor palpable. The venous pressure was 240 mm. of physiological solution of sodium chloride. These findings satisfied the requirements of the triad of chronic compression. Corroborative diagnostic points were decompensation out of proportion to the apparent cardiac disturbance, ascites out of proportion to the edema and absence of visible ventricular motion on fluoroscopy. Suggestive findings were a low pulse pressure, a small slurred QRS complex and a low cardiac output.

A roentgenkymogram supplied irrefutable evidence of the reduced amplitude of cardiac pulsation and the throttling effect of the disease upon the

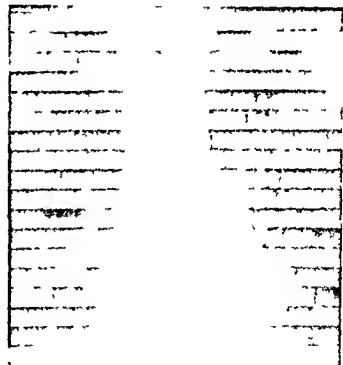


Fig. 1. Pre-operative roentgenkymogram showing no waves over either ventricular area. This clearly indicates complete absence of lateral ventricular movement due to the choking effect of the tight inelastic pericardial scar. The exaggerated abnormal auricular waves are probably caused by the upward thrust of the ventricles into the auricular space during ventricular diastole, since this is the only avenue possible for ventricular expansion. The aortic waves are diminished because of low pulse pressure.

cation with the respiratory tract has been established.

The author urges early X-ray examination as it may reveal the situation and nature of the obstruction, the size and shape of the growth, the condition of the esophagus above the lesion, and the fixation of the tumor.

After the X-ray examination esophagoscopy is the most important method. By its use the presence and nature of a suspected lesion can be determined or a fragment removed for histological examination.

It may be taken as an axiom that it is not practical to excise a sufficient length of the esophagus for cancer and make an end to end anastomosis *in situ* as the ends cannot be apposed without tension if more than 4 cm. is removed. This amount would not be sufficient for the eradication of any malignant neoplasm likely to be found in the esophagus. It is essential to remove a large section of the tube if the ablation is to hold out any prospect of eradicating the disease. The one essential is removal of the growth as complete and wide as possible and without reference to the repair of the esophagus.

With regard to operative treatment the author has formulated certain definite conclusions. If in a case of known cancer of the esophagus there is no evidence of metastasis and nothing to suggest fixation, he undertakes operation. When the growth is in the upper 2 or 3 in. of the esophagus the approach is from the neck. If it is possible to ligate the tube well below the growth he cuts it across and brings the upper end out. If the division is done with the cauter, the lower end of the esophagus can be relied upon to take care of itself and the upper part of its bed will

become safely obliterated. If the growth is in the lower 2 or 3 in. of the esophagus the approach should be through the abdomen. If the tumor can be separated all around with the finger and the lower part of the esophagus mobilized, the author thinks the complete 'pull through' operation may be done. For cases in which the tumor is situated in the middle of the thoracic esophagus Turner suggests a combined posterior mediastinal and transpleural exposure.

He believes that the collo-abdominal or pull through method is a worthy procedure with the following modifications: (1) excision of the medial half of the clavicle to obtain a better approach from the neck; (2) distention of the cellular tissue by the injection of a fluid and care to carry out the enucleation with gentleness and deliberation; (3) completion of the removal by drawing the esophagus up into the neck rather than downward into the abdomen; (4) allowing the esophagus to withdraw from its bed to lie free on the front of the chest until the cellular tissue spaces of the neck and thorax are safely shut off; and (5) more active steps to combat hemorrhage and delayed shock. One of his methods is the use of a rubber tampon consisting of a soft rubber tube which is drawn into the esophageal bed and then filled with hot fluid while *in situ*.

In conclusion Turner reported a case in which he excised the esophagus, made a complete tube of skin and joined the latter at both ends to the normal structures. The antethoracic esophagus functioned satisfactorily for about a year. At the end of that time the patient died of nephritis.

J. DANIEL WILLEMS, M.D.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Chydenius, J. J. Acute Peritonitis (Die akute Peritonitis) *Acta Soc. med. Fennicae Duodecim*, 1935, Ser. B, Vol. 23

After discussing the question of the pathophysiology of peritonitis and emphasizing the great importance of disturbances of the peripheral circulation in the development of the condition, the author discusses all types of acute peritonitis originating from the female genitalia. He cites the difficulties in the classification and statistical treatment of the material.

The material reviewed consisted of more than 100 cases of acute free peritonitis of different types which were treated in the Obstetrical and Gynecological Clinics of the University of Helsingfors. The majority were cases of diffuse peritonitis due to abortion which were treated during the last fifteen years in the First Gynecological Clinic.

During the first five year period, from 1919 to 1924, chiefly conservative treatment was used. All except 1 of the 24 patients died.

Since 1925 a systematic attempt has been made to improve the results by more active therapeutic methods. During the last ten years 70 cases of abortion peritonitis were treated. In 18, which were apparently hopeless, operation was not performed, and in 12, which were very unfavorable, only drainage was done. In 40 cases, radical operation with vaginal drainage and, in early cases, with high peritonization, was performed. The author describes the technique in detail. Fifteen of the 40 patients recovered. Diffuse streptococcus peritonitis was present in at least 10 of the cases terminating in recovery.

Improvement is unquestionable if the entire material is taken into consideration. However, as the problem is so complicated, a critical attitude should be maintained as statistics based on small figures may be very deceptive, especially as the patients who survive remain alive at the cost of very important organs.

In a study of the reviewed material from various points of view to obtain more definite and exact indications for operation, the author made the following observations:

1. To all of the cases in which the patient survived the radical operation, the operation was performed during the first four months of pregnancy. In cases of abortion occurring at a later date and in cases of premature delivery, the prognosis was exceedingly unfavorable.

2. The time that elapsed between the abortion and the beginning of the peritonitis was a very important factor. In almost all of the fatal cases

the peritonitis developed during the first week after the abortion, whereas in half of the cases with recovery after radical operation it developed later.

3. In general, radical operation was followed by recovery only in cases in which fully developed local purulent foci were found. The particularly good results obtained in cases of rupture of suppurating ovarian cysts were in agreement with the observation that the prognosis improves rapidly the greater the length of time that elapses between the abortion and the peritonitis.

4. Pelvic thrombophlebitis with macroscopically visible and often purulent thrombi was found not infrequently at operation. The fact that such thrombi were discovered nearly always in the later months of pregnancy partly explains why the prognosis is so unfavorable late in pregnancy. However, in several cases with definite thrombi life was saved.

5. The outcome was favorable only when operation was performed early. Radical operation performed after more than twenty-four hours was of no avail.

From these observations it is evident that in very septic cases and old neglected cases extensive operations are impossible. Moreover, it appears hopeless to attempt to overcome the infection when the peritonitis develops immediately after the abortion and presents more or less the picture of so called "peritoneal sepsis."

However, as early operation yields good results in cases of old ruptured pyosalpinx and suppurating ovarian cysts, it seems logical to conclude that there is, so to speak, a "lower limit" up to which operation is the treatment to be preferred. It appears logical to operate also for recently ruptured purulent foci.

For the avoidance of unnecessary operations, clinical experience and continuous careful observation are essential. The best results are obtained in cases in which expectant treatment is employed until a free peritonitis becomes an encapsulated pelvipерitonitis.

Borsotti, P. C. A Telangiectatic Fibromyxolipoma of the Great Omentum (Fibromixolipoma telangiectatico del grande omento) *Arch. ital. di chir.*, 1936, 42, 371.

The author reports a case of telangiectatic fibromyxolipoma of the great omentum in a man thirty-seven years of age.

The patient had been a very heavy wine drinker, consuming from 6 to 7 liters a day. After two days of banqueting and drinking he was taken ill with acute and more or less continuous pain in both lower quadrants of the abdomen and slight fever. There was no vomiting or nausea.

Examination revealed a hard painful mass the size of a fetal head in the left iliac fossa. With the exception of this, all other clinical findings and all laboratory findings were negative.

At operation the tumor mass was discovered to have many adhesions to the intestines and to the mesentery of the small bowel. A finger like process of the mass extended into the left inguinal canal.

The tumor was completely removed. It weighed 1,200 gm. The histological findings are reported in detail.

CARLO S. SCUDERI, M.D.

GASTRO-INTESTINAL TRACT

Ravdin I. S., Pendergrass E. P., Johnston G. G. and Hodges P. J.: The Effect of Foodstuffs on the Emptying of the Normal and Operated Stomach and the Small Intestinal Pattern. *Am J Roentgenol* 1936 35 306.

From a previous study upon the absorption of glucose from loops of small intestine the authors concluded that the rate of absorption of glucose from such loops was dependent in large part upon the concentration and the amount of the solution used, that with an increase in the concentration or quantity, increasing amounts of glucose were absorbed.

These observations were not in agreement with the findings of Cori who concluded that the amount of glucose absorbed from the intestinal tract has no relation to the concentration of the solution used. Cori found that regardless of the concentration the amount of glucose which was absorbed in a given time depended solely upon the body weight. However, he placed his solutions in the stomach thereby using the gastro intestinal tract as a physiological unit.

In experiments in which the authors introduced solutions varying in concentration from 3.5 to 50 per cent into the stomachs of unanesthetized dogs they found that at the end of an hour the concentration of glucose in the small intestine was approximately between 3 and 5 per cent. These investigations provide evidence that the stomach and duodenum play an important part in preparing certain foodstuffs for acceptance by the small intestine.

If the pyloric sphincter were the sole factor in preventing passage from the stomach of substances not acceptable to the duodenum, gastric enterostomy, the Billroth I and the Polya operation would permit rapid passage into the small intestine of substances which this portion of the intestinal tract is not called upon to accommodate under normal conditions. The concept of such procedures as dumping operations is widely accepted and generally taught. In carrying out these three operative procedures in a series of dogs, the authors found that, regardless of the type of the operation, the stomach functioned normally in that the gastric residue at the end of one hour was considerable and well within the limits of the amounts to be expected in dogs not operated upon.

In studies on human beings and dogs the authors added a wide variety of substances to a standard amount of barium sulphate and determined the emptying time of the stomach. In the dogs the previously reported observation that 50 per cent glucose or a small amount of olive oil will cause marked delay of gastric emptying was confirmed. It was determined also that when olive oil or a hypertonic solution of glucose was dropped into the duodenum through a tube in the common bile duct, gastric emptying was nearly completely stopped during the period of duodenal instillation.

It was impossible to demonstrate any hormonal mechanism which would delay gastric emptying time when olive oil and hypertonic glucose solutions were placed directly in a modified T-bury loop of the jejunum. In the studies made on human beings the addition of a hypertonic glucose solution, olive oil and protein solutions to a standard barium meal always delayed gastric emptying time. Glucose and olive oil were most effective.

In other investigations made by the authors a series of patients were examined at intervals after posterior gastro-enterostomy, the Billroth II and the Polya operations. The effect of the addition of olive oil, protein and a hypertonic solution of glucose to the barium meal was essentially the same in the patients operated upon as in persons not operated upon. The new stoma did not provide for immediate emptying into the jejunal segment, even when a simple water barium meal was used.

The authors conclude that under the conditions normally imposed on the stomach by diet, post-operative gastric function is the same as the function of the normal stomach with the pylorus intact. Under such conditions the new stoma, regardless of its size, does not in itself permit rapid emptying.

SAMUEL J. FOGELSON, M.D.

Fromme A.: The Causes and Methods of Treating So Called Cardiospasm Based upon Clinical Experience (Ueber Ursachen und Behandlungsmethoden des sogenannten Kardiospasmus auf Grund klinischer Erfahrung). *Beitr z klin Chir* 1935 162 337.

In the last fourteen years the author has treated twenty-four cases of cardiospasm. Thirteen of the patients were women. Fromme classifies the cases etiologically into three groups: those with a psychogenic disturbance of the cardiac innervation without any anatomical change; those in which the condition was due to an organic cause—paralysis or irritation of the nerves—supplemented by psychic trauma; and those with purely organic disturbances.

In three cases with organic changes there were evidences of previous disease of the cervical lymph glands. In three others pulmonary changes of a probably tuberculous nature were found. In one case the cardiospasm followed a severe attack of grippe and in another the birth of a third child. In two cases duodenal ulcer was suspected, and in three the condition was attributed to trauma.

The author distinguishes the type according to the form of the esophageal dilatation. In one type the enlargement extends all the way to the neck. Fromme attributes this type to a general disturbance of the innervation of the organ. In another type the greatest enlargement occurs in the supracardial part of the esophagus which at first remains straight, but after prolonged stasis above the diaphragm forms a broad sac with its convexity to the right. The latter type is believed to be due to a disturbance of the opening reflex of the cardia.

Of the author's twenty four patients, nearly all of whom were subjected to repeated physical and roentgen examinations, fifteen were treated surgically. In one case gastrostomy was done, in two cases, an extramucous cardiectomy by Heller's method, in four, plastic surgery, and in eight, gastroesophago anastomosis by Heyrowsky's method. The one death, which was due to suture insufficiency, followed a Heyrowsky operation. In five cases the esophagus was dilated with Starck sounds, a method which failed in two other cases. Two patients were treated by strictly conservative methods.

The evaluation of the results of treatment is difficult because the findings at various follow up examinations may vary greatly. An important difference between the patients who were operated upon and those who were treated conservatively or not treated at all was the fact that those treated surgically were never again troubled by inability to swallow or malnutrition. The best functional and anatomical operative results were obtained by anastomosis although painful spastic conditions were very common in patients so treated. The second best results were obtained by Heller's operation and by dilatation with Starck sounds. A patient who was not benefited by an operation performed by Heller was operated upon by the author by the transpleural method because it appeared that the Sauerbruch abdominal operation would be difficult. The operation was followed by death from an undetermined cause. Although most surgeons have rejected treatment with Starck sounds, the results in the author's cases in which this method was used (mild and moderately difficult cases) were satisfactory. In some of them, however, repeated dilations were necessary. Fromme calls attention to the fact, demonstrated also in one of his cases, that considerable improvement of cardiospasm may occur without treatment. The most unfavorable results in his cases were those of plastic surgery. On account of the cicatricial changes which are always to be expected at the cardia, he repeats sounding or performs a second operation only after careful consideration.

The technique of the transabdominal operation which is preferred by Fromme for the relief of cardiospasm is as follows:

Depending upon the form of the costal arch and the site of the cardia, a medial, hooked, or rib margin incision is made under anesthesia of the abdominal wall supplemented by intestinal or in-

halation anesthesia. A transverse incision of the peritoneum is then made at the site of the cardia. After displacement of the vagus nerve from the region of the cardia and withdrawal of the esophagus from the diaphragm to an extent of from 6 to 9 cm., the esophagus is ligated as far toward the oral cavity as possible with a strip of gauze and the stomach is similarly ligated after the formation of an opening in the lesser omentum and the gastrocolic ligament. Both strips of gauze are then fixed to the stomach and esophagus by a suture so that the organs are closely approximated. Anastomosis is done in two layers with an inner suture of catgut and an outer suture of silk, and the suture line is covered with a flap of peritoneum.

(KEMPF) MATTHIAS J SEIFERT M D

Yonkman, F F, Hiebert, J M, and Singh, H
Morphine and Intestinal Activity. *New England J Med*, 1936, 214, 507

Morphine was formerly believed to be a "bowel splint" because of its supposed immobilizing effect on the intestine. It is now thought that in the ordinary dosage of $\frac{1}{8}$ and $\frac{1}{4}$ gr it produces its beneficial effects by stimulating motility and tone.

The authors studied the effects of morphine in the cases of five patients, a woman and four men. Two of these patients had a Mikulicz operation, one a cecostomy, and two a colostomy. A graphic record of the bowel activity was obtained by the method of Plant and Miller. In this procedure long, sausage shaped balloons of rubber tied to rubber catheters are introduced into the lumen of the large and small intestines. The catheter is connected to a water manometer in which any change in water level and air volume is recorded graphically on a smoked paper on the kymograph through a modified Brodie air bellows. The kymograph is so placed at the bedside that the patient is unable to see the record.

All of the patients studied by the authors showed some form of stimulation of either the ileum or the colon, the result depending on the individual patient, the dosage of morphine, and the bowel area studied.

In cases of suspected peritonitis morphine should be employed to prevent excessive bowel distention, the dosage being repeated at intervals of three or four hours. When there is danger of perforation of a weakened bowel, an increase in tone produced by morphine may be advantageous. It is possible that, postoperatively, by increasing the bowel tone, morphine may relieve the so called "gas pains" by preventing distention. Increased bowel activity promotes the passage of gas and improves its absorption as well as the absorption of liquids. It appears that the comfort produced by morphine is due to a peripheral stimulating action in the intestine as well as a central depressant action on pain perception. In intestinal hemorrhage, morphine will give relief more quickly if the tonus is increased.

JOHN W. NUTZ, M D

Doub H P and Jones H C Primary Malignant Tumors of the Small Intestines *Radiology* 1936, 26 209

Malignant tumors of the small intestine constitute from 3 to 6 per cent of all malignant gastro intestinal tumors. After discussing their clinical manifestations roentgen characteristics and gross pathological changes the authors review nine cases of carcinoma of the duodenum, three cases of carcinoma of the jejunum, one case of sarcoma of the duodenum and jejunum and two cases of carcinoid tumors located in the jejunum and ileum respectively. They report several of these cases in detail to illustrate the various types of lesions.

Carcinomas of the duodenum occur anatomically as supra ampullary, periampullary and infra ampullary lesions. They may all produce clinical signs of obstruction of the duodenum. Those of the periampullary type are associated in addition with varying degrees of jaundice depending upon the degree of obstruction of the ampulla. Pain is the most prominent symptom. Occult blood is almost always found in the stools. The roentgen changes vary from an irregular narrowing of the lumen to complete obstruction with a filling defect. The tumors are usually adenocarcinomas. Metastases occur with great frequency to the regional lymph nodes, liver and pancreas.

Primary sarcoma of the duodenum is very rare. Only about sixty cases have been reported in the literature. Lymphosarcoma is the predominating type. The growths attain a large size with infiltration of the bowel wall but with very little encroachment upon the lumen.

Malignant tumors of the jejunum and ileum have fewer localizing symptoms and signs than those of the duodenum. Obstructive symptoms and signs are the most common findings in this group of tumors. Obstruction may be caused by intussusception or by occlusion of the lumen by the tumor.

Carcinomas of the jejunum and ileum usually originate in intestinal polyps. They tend to ulcerate, undergo scirrhous change and produce obstruction with the usual signs of that condition. A filling defect may also be present.

Sarcoma of the small intestine is most commonly found in the ileum although it occurs also in the jejunum. The clinical findings do not differentiate it from carcinoma. Occasionally a localized dilatation without obstruction is seen in the roentgenogram. This is an aneurysmal like dilatation.

Carcinoid or argentaffine cell tumors occur in all parts of the gastro intestinal tract but are most common in the small intestine. They are of low grade malignancy and are said in some instances to be benign.

ADOLF HARTING M.D.

Probst J G and Gruenfeld G E Acute Regional Ileitis *Ann Surg* 1936 103 473

The authors report three cases of acute regional ileitis. The first patient a boy five and one half years of age, presented symptoms typical of ileocecal

intussusception but at operation an acute inflammatory condition of the terminal 1.5 cm of the ileum was found. Ileostomy was done proximal to the inflamed area, and after a rather stormy convalescence the fistula was closed by resection of a small part of the ileum. At the second operation the inflammatory process was found healed and the specimen obtained showed only a small amount of round cell infiltration.

The second patient had symptoms typical of acute appendicitis, but operation disclosed acute inflammation of 15 cm of the terminal ileum. The treatment consisted in ileostomy (Witzel) proximal to the inflammatory process. On removal of the ileostomy tube the fistula closed spontaneously.

The third patient also was believed to have acute appendicitis but presented inflammation of the terminal ileum at operation. In this case the treatment did not include drainage above the inflammatory process.

All three patients recovered.

Bacteriological studies revealed only organisms normally found in the intestine.

G DANIEL DELFRAY M.D.

Gordon-Taylor G The Complex and the Complicated in the Surgery of the Large Intestine *Proc Roy Soc Med Lond* 1936 29 343

The author calls attention to anatomicopathological conditions of the large intestine and their bearing on operative surgery. A neoplasm of the large intestine may be complicated by other conditions. Surgical interference for disease of the gall bladder may result in the discovery of an unsuspected carcinoma of the large intestine. Pain in the right iliac fossa in middle age or later life always should awaken the suspicion that a constricting carcinoma of the distal part of the colon is present. The surgeon may first come in contact with a neoplasm of the colon when a carcinomatous ulcer or a stercoral ulcer above the stricture undergoes perforation. When extraperitoneal leakage occurs a localized abscess which may be formed may be opened and the growth satisfactorily excised subsequently.

Volvulus of a segment of large intestine containing a growth may demand operation because of the urgency of the symptoms. An invaginated growth may present at the anal orifice or by producing acute abdominal enlargement may give the first evidence that a colonic tumor is present. A pelvic tumor may prove to be a Krusenbergs tumor. Hydrocele that develops suddenly may prove to be of tuberculous or neoplastic origin.

Anatomical abnormality may complicate other wise apparently simple operations. The left portion of the colon may cling to the midline and have a short mesocolon. The transverse colon may be concealed by a distended small bowel. The embryonic midgut may have failed to rotate. The right side of the colon may be extended above the liver to the diaphragm. More infrequently the colon may be in the thorax.

The gravity of intestinal resection and anastomosis will be influenced to a degree by the number of lines of surgical suture, but the operative prognosis is dependent upon a number of factors. The author believes that in complicated or plurisegmental removal of the bowel for cancer the immediate risk to life is not greatly increased by radical operation. Cases in which plurisegmental resection is performed for cancer of the large bowel may be divided into the following five groups: (1) those in which involvement of the abdominal wall is marked, (2) those in which the growth has infiltrated other portions of the alimentary tube, (3) those in which some additional segment of the alimentary canal other than the bowel is involved in the growth, (4) those in which a solid viscus, or a hollow viscus unconnected with the alimentary canal is involved by the growth, and (5) those in which multiple resection is necessary because of some complicating accidental, or concomitant condition unconnected with the primary neoplasm. The author believes that the debatable point is the prospect of prolonged survival rather than immediate risk to life. Cases illustrative of each group are presented.

Pelvic inflection may necessitate resection of the large intestine. Non tuberculous granuloma appears to be especially frequent in the cecum and is readily mistaken for tuberculosis. Certain forms of acute intestinal obstruction may demand double resection of the bowel, one of the segments being colonic. Survival from multiple resection of bowel for gunshot injury is rare. For cure, anastomotic ulcers consequent on gastrojejunostomy demand resection of the stomach and jejunum and perhaps also of the colon. Resected intestine with its mesenteric attachments left intact may be used to construct a vagina or to replace segments after resection as in cases of diverticulitis. The author has encountered only one case of gangrene of the large bowel attributable to mesenteric occlusion.

A complex and complicated technique requiring from two to five operations for the removal of a cancerous segment of colon is defended. Grey Turner admits an operative mortality of 12 per cent while holding that ultimately it may be reduced to 5 per cent. In resecting a segment of the distal part of the colon the author establishes a prophylactic cecal anus. For many growths in the distal part of the colon, diverticulitis, volvulus, and megacolon, he is using the exteriorization method of Paul Mikulicz more and more frequently. In eighty-four cases in which he performed a simple colectomy by this technique the mortality was only 2.4 per cent. An operation in one stage is safe in many cases of cancer of the right side of the colon, especially if enterostomy is performed above the anastomosis and a catheter is inserted. For other cases, some type of exclusion operation in two stages is advocated. In cases of chronic ulcerative colitis the Coffey operation replaces a dangerous one stage operation by a safe three stage intervention. The author concludes that radical, complex, multiple

resections often repay the enterprising surgeon in dealing with cancer of the colon. Many illustrative cases are discussed. CLAUDE F. DIXON, M.D.

Bevan, A. D. The Present Status of the Problem of Appendicitis. *Surg. Clin. North Am.*, 1936, 16, 63.

The author briefly traces the history of our knowledge of appendicitis from the time of Reginald Fitz in 1886 to the present day.

He ascribes the condition to a local inflammation beginning in the mucosa of the appendix at an atrium of infection caused by injury from fermentative products produced in the intestinal tract or by a foreign body, and extending through the other coats of the appendix to reach the peritoneum. He calls attention to the clinical picture as the basic factor in the diagnosis, placing minor emphasis on laboratory findings. He states that if medication is given at all, early in the disease, he recommends the use of minute doses of atropine as an aid in differentiating "spasms" from appendicitis.

Operation within the first forty-eight hours of the attack is advised. On the third, fourth, and fifth day it should be performed immediately unless the symptoms are subsiding. When the symptoms are subsiding, watchful waiting is indicated. If a palpable inflammatory mass is evidenced about the appendix which daily becomes less tender, expectant treatment is advisable. If no immediate indication arises for surgery, delay of appendectomy for from six to eight weeks is indicated.

Appendicitis with general peritonitis is treated by the Murphy plan. This consists of (1) early operation with minimal handling of the gut, (2) removal of the appendix, (3) Fowler's position, (4) the administration of fluids in adequate quantity, and (5) keeping the stomach empty.

When there is gross peritoneal soilage, Bevan modifies this procedure by irrigating the peritoneal cavity with normal saline solution from the incision out through a tube placed in the cul de sac by means of a stab wound just above the symphysis. He advises also adequate drainage by Penrose drains.

He prefers anesthesia induced with ethylene or ethylene combined with local infiltration.

LOPNE WILLIAM CHRISTIAN, M.D.

Trinca, A. J. Some Observations on the Pathology of Appendicitis. *Australian & New Zealand J. Surg.*, 1936, 5, 258.

Trinca contends that the primary causative factor in appendicitis is not bacterial invasion of the mucosa of the appendix.

In a study of the blood supply of the appendix five main variations are noted:

1. An appendiceal artery supplying the appendix only.
2. A cecal artery supplying the proximal portion of the appendix.
3. The proximal portion of the appendiceal artery supplying a portion of the cecum.

4 An accessory appendiceal artery supplying the proximal portion of the appendix

5 An appendix bound to the wall of the cecum supplied by small cecal arteries and with only a rudimentary appendiceal artery

Trinca notes that the appendiceal artery does not anastomose freely with the cecal branches and is in reality an end artery. Therefore at the point of overlap there is a relatively poorly supplied band which he believes accounts for the sharp line of demarcation so often seen in gangrenous appendicitis.

In studies of the position of the appendix both in cadavers and in the living Trinca found that the position of the appendix varies with the location and degree of distention of the cecum and that inflation of the cecum can produce torsion kinks and twists of the appendix. Since the appendiceal artery lies behind the distal portion of the ileum distention of the cecum will tend to cause pressure on the artery with partial appendiceal ischemia.

Partial or temporary interference with the blood supply causes ischemia followed by congestion or tissue stagnation of varying degree and produces the phenomenon of so called catarrh. In certain cases circulatory interference is sufficient to lower the resistance and thereby permits secondary invasion by any intestinal flora present. This process may be confined to the mucosa or extend through all coats and involve the peritoneum. A longer period of anemia produces gangrene. The portion of the appendix involved varies with the type of blood supply and the vessel obstructed.

If the obstructive process is of short duration, complete recovery can occur but when it is of longer duration some damage is inevitable. Desquamating epithelium may not be restored. The secondary inflammation may result in fibrosis stenosis atrophy atonicity, and the formation of adhesions. It can pave the way for a subsequent attack of obstructive appendicitis or make a future attack more serious in its results.

Perforation may result from pressure gangrene due to a fecolith.

The author believes that aside from developmental anomalies chronic appendicitis is due to conditions resulting from previous attacks of vascular disturbance and not to a chronic primary infection arising in the mucosa.

Purgatives are aggravating factors as they cause increased peristalsis and cecal distention favoring torsion, kinking and vascular disturbances.

In the author's opinion modern habits of eating and diet are the predisposing factors.

LORNE WILLIAM CHRISTIAN M D

Reid M R, Poer D H and Merrell F A Statistical Study of 2921 Cases of Appendicitis
J Am M Ass 1935 106 665

The authors have reviewed 2921 cases of appendicitis admitted to the Cincinnati General Hospital in the period from January 1, 1915 to January 1,

1934. Of these, 2,035 were diagnosed as acute appendicitis.

Forty one per cent of the patients had had previous attacks, and in the cases of 42.5 per cent the appendix was ruptured at the time of the patient's admission to the hospital. The average duration of the attack before admission was three and eight tenths days. Abdominal pain the most prominent symptom occurred in 94 per cent of the cases. Pain on pressure over the appendix was present in almost all, and seemed to be the most important single finding. The next most important symptoms were nausea and vomiting which occurred respectively, 10.70 and 80 per cent of the cases. As tenderness, induration, and a mass were found on rectal or pelvic examination in 44 per cent of the cases, the authors believe that these procedures are of great value. Thirty six per cent of the patients had taken purgatives prior to their admission.

In 576 (66 per cent) of the 863 acute cases with perforation a localized abscess formation was found. In 33 per cent of the cases with perforation there was peritonitis of varying degree. In the majority it was advanced and widespread.

Since 1922 the McBurey incision has been used routinely. Prior to that, the right rectus incision was employed.

The authors describe their routine operative procedure in various types of acute appendicitis.

In the reviewed cases the incidence of wound infection following operation in which drainage was not employed was 0.06 per cent. The infection was superficial in all except 3 cases, in which the wound was completely broken down and evisceration occurred. In all of the latter a right rectus incision had been employed. The authors believe that drainage is not indicated in cases of acute gangrenous appendicitis without rupture but with a cloudy peritoneal fluid.

In 1,147 cases of acute appendicitis without rupture the mortality was 0.86 per cent. 10.576 of ruptured appendix with abscess 11.4 per cent. 12.280 of ruptured appendix with peritonitis 33.9 per cent, in 734 of chronic appendicitis, 0.13 per cent and in 59 in which an erroneous diagnosis was made 6.7 per cent. The total mortality in these 2,806 cases was 6.3 per cent.

Since making this study the authors have been using the conservative or Ochsner method of treatment when they believe it is indicated, in an attempt to lower the mortality in cases presenting peritonitis or abscess. They expect to make a comparative study from this aspect at a later date.

LORNE WILLIAM CHRISTIAN M D

Goinard P, and Merz H. An Operation for Redundant Sigmoid in One Stage (L'opération du dolichosigmoïde en un temps) *J de chir* 1936, 47 220

Goinard and Merz describe an operation for redundant sigmoid which may be performed when volvulus is a complication. A median incision as

short as possible is made, and the loop of sigmoid to be resected is brought outside. The mesosigmoid is ligated and sutured so that the loop is completely externalized. The peritoneum is then sutured around the two branches of the intestinal loop, and the abdominal incision is partially closed around the loop. The two branches of the loop are held with forceps above the level of the section of the mesosigmoid, and the intestine is cut with scissors just below the forceps. The two ends of the loop projecting outside the peritoneum and the abdominal wall are then anastomosed by sutures in three planes. The anastomosis is made almost complete, only a small opening being left at the anterior portion for the introduction of a drain into the upper (proximal) branch of the loop. The abdominal incision is closed around the drain by suture of the aponeurotic layer. On removal of the drain, the slight fistula closes spontaneously or may be closed with a few sutures. When closure is complete, the anastomosis still remains extraperitoneal.

This method has been used by the authors at Algiers in seventeen cases of redundant sigmoid, four of which were complicated by volvulus. Of the seventeen patients, eleven were natives of North Africa. The authors are of the opinion that dietary factors contribute to the frequency of redundant sigmoid in these natives. In all of their cases good results were obtained with complete healing within from three weeks to two months. In some cases roentgen examination revealed evidence of some stenosis at the site of the anastomosis, but in no case was there clinical evidence of obstruction. The stenosis was no more marked than that found after other methods of operation for redundant sigmoid.

ALICE M. MEYERS

Hayden, E. P. Cancer of the Rectum and Sigmoid.
New England J. Med., 1936, 214, 401.

The author reports eighty-one cases of cancer of the rectum and sigmoid observed during the last nine years. He estimates the incidence of operability in this series at from 65 to 70 per cent. Twenty patients died within from four to seventy months after operation. It was reported that recurrence developed in all but two of the latter, and the growths were of a high grade of malignancy. At the time this article was written twenty-four patients were alive, having survived for periods up to sixty-six months. Of ten patients who were alive and well for three years or more after operation, none had regional metastases.

Fifty-two cases in which six different types of radical operation were performed are discussed in detail. In the first ten cases the operation was done in two stages. Abdominoperineal resection was the operation of choice in about 80 per cent of the cases. The operative mortality was 16.6 per cent. In the eleven cases in which a two-stage abdominoperineal operation was indicated the Jones operation was performed. The operative mortality was 9.1 per cent. The one-stage procedures were performed

according to the technique of Miles, the perineal part of the operation being carried out with the patient in the right Sims' position. In all cases in which operation was performed in one stage, a transfusion of blood was given at the end of the operation. The colostomy was usually performed through a short, left lateral rectus incision. The long paramedian incision was closed without drainage.

The colon is usually sutured to the left parietal peritoneum so as to obliterate the aperture lateral to the colonic stoma. Simple colostomy with posterior resection at a later date is considered the safest operation for rectal cancer, but complete and careful removal of the pelvic mesocolon and other node-bearing tissues in the pelvis cannot be done by the posterior route.

The author advises anterior resection with inversion of the rectal stump and end colostomy when the tumor is high enough to permit dissection well below it, but not high enough to allow resection with direct suture or a Mikulicz procedure.

Because of the added risk, pathological conditions in organs such as the gall bladder and appendix are not treated in the course of surgical excision of the cancer.

In his abdominoperineal resections, Hayden uses a paramedian incision. He prefers ether anesthesia to spinal anesthesia because of its certain duration. He emphasizes the importance of adequate peritoneal flaps in the construction of a new pelvic floor. In the procedure he employs rubber covered clamps are applied about 6 in. apart above and below the point of resection. The bowel is then divided with the cautery between heavy, tightly tied, silk threads. Each end of bowel is protected by a rubber dam. When the surgeon is right handed it is advisable for the patient to be placed in the right Sims' position. The rubber covered distal end of gut is identified through the posterior incision and traction is exerted with the left hand, from above downward, in the plane of cleavage between the prostate gland or the vaginal wall and rectum. The region is lightly packed with gauze in a sheet of rubber dam and drainage is provided anteriorly in the perineal incision. The colonic stoma is opened after from twenty-four to forty-eight hours.

After reporting a case of cancer with multiple metastases to bone Hayden discusses the diagnosis and treatment of benign adenomas.

He concludes that apparent cures of rectal and sigmoid cancer have been obtained chiefly in cases in which there was no perirectal involvement at the time of the operation and those in which the tumor was a malignant adenoma or an adenocarcinoma of Grade 2.

CLAUDE F. DIXON, M.D.

Daland, E. M., Welch, C. E., and Nathanson, I.
One Hundred Untreated Cancers of the Rectum.
New England J. Med., 1936, 214, 451.

The authors studied 100 fatal cases of cancer of the rectum in which operation was not performed.

A change of intestinal habit was taken as the criterion for the onset of the disease. The ratio of males to females was 2:1. The average age at the onset of the symptoms was fifty-nine and six tenths years, and the average length of life after the onset of the symptoms was seventeen and two tenths months. There was no significant variation in the length of life of the patients who ranged in age from thirty to ninety-five years at the onset of the disease. One patient died one month and another forty-nine months after the onset. The cases were fairly evenly divided between the ages of forty-five and seventy-five years. All of the patients died of cancer.

Eighty patients who had undergone colostomy without any other treatment were studied. Their average age at the onset of the disease was fifty-eight and one tenth years. Their average length of life from the onset of the disease was sixteen and nine tenths months. Their average length of life following the colostomy was six months. The operative mortality was 12.5 per cent. The statistics show that patients treated by colostomy live no longer than those who are untreated. Comfort of the patient is the only consideration in the performance of colostomy if radical operation is not contemplated.

The effect of roentgen treatment applied to the local lesion in connection with colostomy was studied in a group of 32 cases, but the findings were inconclusive. However, the irradiation seemed to relieve the pain.

A group of 42 cases in which radical operation was performed were studied. Twenty-five of the patients were males. The average age of the patients at the onset of the symptoms was fifty-four and five tenths years. Eleven (62 per cent) of these patients died as a result of the operation, 2 died of intercurrent disease without recurrence within five years, 12 (30 per cent) were alive and free from disease five years after the operation, and 17 died of cancer.

The authors' figures agree with those of the British Ministry of Health which indicate that either there is no significant relation between the patient's age at the onset of the disease and the duration of the disease or available data are not sufficient to establish the relation.

Attention is called to a group of 45 patients who were treated with radium by Hayden and Shedden. Hayden and Shedden concluded that patients treated with radium alone live no longer than untreated patients, that patients subjected to colostomy live an average of four months longer than untreated patients, and that patients treated by colostomy and radium irradiation live four months longer than those treated by colostomy alone.

The average age of patients subjected to radical operation was five years less than that of untreated patients.

Patients suffering from cancer of the rectum will live as long if no treatment is given as they would if

they were treated only by colostomy. However, they will be much more comfortable during the remaining part of their lives if they submit to colostomy. In the reviewed cases in which radical operation was performed the average length of time between the onset of the condition and treatment was eight months, and in those in which colostomy was done it was seven months. The operative mortality of radical resection of the rectum in 1 or 2 stages is low enough to warrant radical operation when there is a probability that the growth can be removed. After such treatment the life span is much longer and the patient is free from symptoms.

CLAUDE F. DIXON, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Ratti, A. Hepatography (In tema di epatografia).
Radiol. med. 1936 23:1.

Ratti describes the roentgen features of certain morbid changes occurring in the liver and discusses critically the diagnostic and clinical value of hepatography.

Hepatography was introduced in 1930. It consists essentially of roentgenography of the liver following the intravenous injection of about 1 c.c. per kilogram of body weight of a colloidal suspension of thorium dioxide. In order to prevent untoward effects the contrast substance is administered in stages over a period of a few days.

The method is based on the fact that the cells of the reticulo-endothelial system have the capacity of storing thorium particles and therefore areas of increased density are produced in organs such as the liver and spleen, which contain considerable amounts of reticulo-endothelial tissue.

By means of hepatography Ratti has studied particularly carcinomatous metastases to the liver. In the roentgenograms the metastases appear as lacunar areas of decreased density because neoplastic regions are poor or devoid of reticulo-endothelial tissue and therefore not capable of becoming impregnated with the radio-opaque substance. The number, form, size and arrangement of these lacunar areas range within wide limits.

The method has many pitfalls and has sometimes led to misinterpretations. By comparing the results of hepatography with surgical and postmortem findings, the author has been able to determine some of the most important sources of error. In his opinion hepatography is of great diagnostic aid if it is carried out properly and under well-defined clinical circumstances.

Ratti emphasizes the relative harmlessness of the thorium preparations used for hepatography, but calls attention to certain untoward effects which have been noted. The immediate effects are negligible. They include an unpleasant sensation at the time of the injection and occasionally a rise in the temperature, but these symptoms are transitory and insignificant. Only a few deaths have been reported.

However, it must be borne in mind that the patient should be in good general condition at the time of the injection. As late effect, a general diminution of parenchymatous function throughout the body has been observed in experimental work with animals, but no fatalities in clinical cases have been reported.

Ratti concludes that hepatography should be done only in cases in which there is a definite clinical indication for it and effective treatment depends largely upon the diagnosis. RICHARD E. SOMMA

Zanardi, F., and Presitera, A. Contributions to the Functional and Anatomical Study of the Liver in Diseases of the Extrahepatic Biliary Tract. II Subacute Hepatitis and Nodular Hepatitis of Biliary Lithiasis Exclusive of Icterus (Contributi allo studio funzionale ed anatomico del fegato nelle malattie delle vie biliari extraepatiche. II. L'epatite subacuta e le epatiti nodulari della litiasi biliare esclusi gli ictteri) *Arch ital di chir.*, 1936, 42, 169.

This article deals with (1) subacute hepatitis in cases of gall stones in which operation was performed immediately after the subsidence of a febrile biliary colic unaccompanied by jaundice, and (2) nodular subacute hepatitis accompanying chronic calculous cholecystitis. The histological data were obtained from thirty biopsies, four of which showed a lesion of the second type and the rest a lesion of the first type. Eight cases, including all those of nodular hepatitis, were studied in detail with pre-operative and postoperative functional tests and re-examinations of the patients at intervals up to nineteen months.

In the first group of cases the liver showed congestive and inflammatory lesions of the mesenchymal vascular apparatus and reactive and degenerative changes in the parenchyma. While it is difficult to establish a relationship between the hepatic and gall bladder lesions from purely histological data, the fact that the affection of the intrahepatic bile channels was usually minimal appears to show that it is not the primary factor. The authors believe that the first attack of biliary colic marks the beginning of hepatic involvement, since in this group of cases the liver lesions were acute or subacute, with no trace of previous inflammation, while the lesions of the gall bladder were chronic. They are of the opinion that some attacks represent crises of hepatic congestion of an allergic nature.

The authors have found no clear description of nodular hepatitis although it is a well defined type. The cases they report were those of women ranging in age from twenty-six to forty-two years, who had had calculous cholecystitis for several years without serious impairment of their general health. The nodules, none of which exceeded microscopic size, surrounded the interlobular veins. Their essential characteristic was the reaction of the liver cells, which assumed epithelioid, syncytial, or giant forms. This epithelial center, which often under-

went necrosis, was surrounded by a zone of round cells and a well demarcated reticular capsule. Parenchymatous inflammation predominated over sclerosis. The granulomas were not connected with the bile capillaries, and inflammatory changes were always more marked in the veins than in the lymphatics. The surrounding parenchyma was unaffected. It was impossible to determine whether the inflammatory or the degenerative factor was primary in the origin of the granuloma. The liver and bile were sterile except in one instance in which the bile contained a non-hemolytic streptococcus.

The authors discuss the fine points of the differential diagnosis of nodular hepatitis from the more or less similar foci encountered in the acute infections, tuberculosis, syphilis, and the mycoses. The characteristics of the nodules are due partly to the low virulence of the infection and partly to the diffuse and intense inflammation of the vascular mesenchymal apparatus which distinguishes this type of hepatitis from the usual type accompanying cholecystitis. Nevertheless, in some instances (particularly early tubercle) the histological criteria are insufficient and clinical data are required.

In three of four cases the only functional test affected was the van den Bergh test. After operation this returned to normal and the clinical cure was complete. In the remaining case the symptoms recurred and a definite alteration of liver function became established.

In the authors' opinion, nodular hepatitis has the generic characteristics of a secondary infective hepatitis, the organism entering the liver through the portal system and locating at the point of least resistance, viz., the bifurcation of the interlobular vein. As a rule it is only a complication of the extrahepatic affection and yields to surgical treatment of the latter. Occasionally, however, it progresses independently. Although the final stages of the nodules are unknown and it is histologically possible that they may form the basis of a chronic hepatitis, the clinical and laboratory evidence leads to the conclusion that healing usually occurs, probably by means of small compressible reticular scars which may finally regress completely with absorption of the necrotic material. The process appears to be a slow cicatrization without injury to nearby tissues.

The article is accompanied by clinical histories, laboratory data, photomicrographs, colored plates, and a bibliography. M. E. MORSE, M.D.

Zanardi, F., and Previtera, A. Contributions to the Functional and Anatomical Study of the Liver in Diseases of the Extrahepatic Biliary Tract. III The Liver in Chronic Calculous Cholecystitis and Non-Calculous Cholecystitis (Contributi allo studio funzionale ed anatomico del fegato nelle malattie delle vie extraepatiche. III. Il fegato nelle colecistiti calcinose croniche e nelle colecistiti non calcinose) *Arch ital di chir.*, 1936, 42, 273.

On the basis of the clinical course, the authors recognize a chronic and a subchronic type of chole-

cystitis with stones. This classification conforms well with the results of functional tests. The histological findings in the liver, and the postoperative course. In the purely chronic cases, characterized clinically by dyspepsia, gastralgia and colic and the absence of fever and icterus, the hepatic lesions involve predominantly the interstitial tissue. A chronic inflammation, fibrosis of Ghisson's capsule, and a hypertrophy hyperplasia of the endolobular reticulum are found. The parenchymatous lesions are always negligible and confined to circumscribed foci. As they are usually not severe the functional capacity of the liver is reduced only slightly, if at all. The authors found also that the fibrotic and atrophic changes seen in biopsy sections taken from the liver margin tend to exaggerate the severity of the condition and may confuse the diagnosis.

As the results of operation are always good from the clinical as well as the functional point of view, the authors conclude that the hepatitis encountered in connection with chronic cholecystitis with stones is of minor importance.

In subchronic cholecystitis on the other hand the clinical course and the results obtained by cholecystectomy are rather unsatisfactory. This is readily explained by the findings of anatomical, functional and surgical studies. The lesions involve the gall bladder and surrounding structures, and there is a peculiar form of hepatitis which is characterized by a periportal lymphangitis, perihepatitis, and cholangitis. The functional capacity of the liver is definitely reduced and the digestive disturbances and functional alterations tend to persist after operation. These facts suggest that in such cases under the influence of an infectious factor (lymphatic or biliary inflammation) a hepatitis may become progressive quite independently of the gall bladder involvement.

The authors subdivide cases of cholecystitis with out stones into (1) those of chronic cholecystitis, (2) those of adhesive pericholecystitis and (3) those of appendicocholecystitis.

They conclude that cholecystitis with or without stones may be accompanied by a hepatitis which may be progressive. Adhesive pericholecystitis may run an independent course without involving the liver. Appendicitis may be associated not only with a demonstrable cholecystitis but also with a mild and functionally non demonstrable hepatitis suggesting that the liver may be attacked in any toxic or infectious process occurring in the intra abdominal regions which drain into the portal vein.

RICHARD E. SOMMA

Aronsohn H. G. Experimental Studies of Bacterial Cholecystitis. *Am J Surg* 1936 31: 18

The experimental studies reported in this article were carried out over a period of thirty six days with streptococci, staphylococci, the colon bacillus and the bacillus welchii.

As a rule the bacteria were introduced into the gall bladder under ether anesthesia through a cath-

eter inserted through the common duct but in a few instances bacterial suspensions were injected through the gall bladder wall.

The results showed that in a non traumatized gall bladder it is difficult to produce cholecystitis by the introduction of virulent bacteria but in the presence of stasis of the bile (produced by ligation of the cystic or common duct) or of trauma to the gall bladder wall, severe infection occurs with considerable constancy. G. DANIEL DELFRAT M.D.

Hicken, N. F., Best R. R. and Hunt H. B. Cholangiography. *Ann Surg* 1936 103: 250

The authors state that the injection of radiopaque substances directly into the gall bladder and bile ducts gives an accurate roentgenographic picture of the condition of the biliary tract. It demonstrates whether the ductal system is patent or occluded, shows the position and number of calculi, the extent and location of strictures, and the functional status of the sphincter of Oddi, outlines fistulous communications and demonstrates dilatation and sacculization of the bile ducts. It makes it possible to determine how long the biliary tract should be drained, confirms the patency of the common duct before the drainage tube is removed and shows whether or not cholecystectomy will decompress the entire biliary system.

The authors describe two methods of cholangiography: the immediate and the delayed. They use lipo iodine diluted to from one third to one half its original concentration with sterile olive oil to render it labile. They prefer stereoscopic roentgenograms combined with fluoroscopic studies. With the immediate method, in which the radiopaque oil is injected during the operation and roentgenographic observations are made while the patient is on the operating table, they have had but limited experience. Such a procedure is indicated particularly in the problem cases in which the diagnosis is questionable or the selection of the proper procedure is difficult.

The delayed method has a much greater range of usefulness. In this procedure the diluted lipo iodine is injected into a drainage tube sutured into the gall bladder or biliary ducts at the time of operation or into a biliary fistula, and roentgenograms are then taken immediately. The exact outline of the biliary system is revealed. If any abnormalities are noted serial roentgenograms are taken at fifteen minute intervals until the diagnosis is established.

The authors observed no ill effects from use of the diluted lipo iodine in cases of acute cholecystitis, cholangitis, stricture, calculi or pancreatitis.

EARL O. LATIMER M.D.

Mirizzi P. L. The Diagnosis of Incomplete Non Calculous Obstructions of the Common Duct (Diagnostic des obstructions incomplètes non calculeuses de choledoque). *Presse Méd. Par* 1936 44: 159

Cholecystectomy is successful in the considerable number of cases in which the lesions are limited to

the gall bladder, but in many cases in which there are anatomical or functional lesions of the common duct it fails. In young persons the common duct is often involved at the beginning of the disease. Because of this fact the author considers biliary lithiasis a system disease acting predominantly on the excretory duct and thereby causing temporary or permanent stagnation of bile which may be aggravated by cholecystectomy.

There are two groups of cases in which the common duct is involved. In the first group the gall bladder is in good enough condition to be anastomosed to the duodenum. In the second group, which is much larger, it is so seriously affected by lithiasis or cicatrization that its removal is necessary. In these cases the anastomosis may be made between the cystic duct and the duodenum, the hepatic and common ducts being left intact.

The exact nature of the condition can be determined by cholangiography carried out during the operation after the injection of lipiodol into the gall bladder. This is quite different from postoperative lipiodol examination. Its principle is physiological, and its object is to guide the surgeon in the choice of operation.

The author reports five cases in which cystico-duodenostomy was performed. The case histories are supplemented with roentgenograms. In all of these cases there was an incomplete non calculous

obstruction of the common duct. As the opaque medium was eliminated perfectly through the anastomosis, there is every reason to suppose that the results will be permanent.

Cystico-duodenostomy is an easy operation technically. It prolongs the operation only a few minutes and does not preclude closure without drainage. It meets the requirements for the prevention of reflux of the duodenal contents (Heister's valves). It is physiological as it utilizes the cystic duct through which the bile passes normally. Roentgen studies made immediately after the operation demonstrate that when there is an incomplete mechanical obstacle (dyskinesia, inflammation of the sphincter of Oddi, or of the pancreas) it enables the bile tract to evacuate the retained lipiodol through the new opening between the cystic duct and duodenum.

Observations made immediately after the anastomosis disprove the generally accepted theory that the gall bladder is filled passively by the pressure developing in the intrahepatic ducts. Impelled by the active contraction of the common duct, the column of lipiodol rises until it reaches the anastomosis. As there is an active mechanism which furthers the passage of the bile through the cystico-duodenostomy, it is reasonable to suppose that the results will be permanent.

AUDREY GOSS MOROAN, M.D.

GYNECOLOGY

UTERUS

Genell S. Experimental Studies on Animals with Regard to the Physiology of the Uterine Musculature (Tierexperimentelle Studien ueber die Physiologie der Uterusmuskulatur) *Acta obst et gynec Scand* 1936 16 54

In the studies reported the author found that in rats estrin lowers the tonus of the uterine musculature and at the same time increases the irritability of the uterus to the hormone of the posterior lobe of the pituitary gland. In small amounts the latter hormone pitocin increases the number of contractions of the estrin stimulated estrous uterine musculature without decreasing their amplitude, an effect contrary to its action on the non stimulated musculature. Estrin seems to be the functional hormone of the uterine musculature. In the castrated rat the motility of the uterus is greatly reduced within a few days after the castration long before true atrophy of the musculature sets in.

Adrenalin has an inhibitory effect of short duration on the uterine muscle in all sexual phases. In the vagina which does not exhibit spontaneous contractions during estrus it produces a rapid spastic contraction. Apparently the adrenalin content of the blood is related to the hormone changes in different phases of the sexual cycle.

The authors' experimental data show good agreement with the assumed functional role of the uterus and vagina from the point of view of motility in the various sexual phases. While definite experimental proof of these functions is still lacking, their hormonal regulation seems to have been demonstrated.

Dieulafe R. Conservation of the Uterus After Total Oophorectomy and the Question of Uterine Hormones (La conservation de l'uterus après ovariectomie totale et la question des hormones uterines) *Rev franç de gynéc et d'obst* 1936 31 21

Numerous reports of menstruation after castration indicate that the uterus is capable of function in the absence of both ovaries. According to Constantini from 30 to 40 per cent of women subjected to bilateral oophorectomy may menstruate regularly after the operation. While the author admits the possibility of incomplete removal of the ovaries in such cases he believes that this phenomenon supports the view that the uterus possesses an internal secretion of its own. This theory is supported by the researches of Ancel and Bounin on rabbits which showed that, during certain phases of gestation, the rabbit uterus contains a 'myometrial gland' with important endocrine functions during pregnancy. Similar findings in other animals have been reported by other investigators. The existence of hormones

in the endometrium and the tubal mucosa of the human female has been postulated by various investigators. Animal experiments have shown that hysterectomy causes ovarian degeneration due presumably to loss of the uterine hormone stimulus.

The author therefore advises conservation of the uterus after bilateral oophorectomy even if the uterus is the site of mild inflammation. He advises also ovarian grafting if this is possible, but states that, even without ovarian grafting, conservation of the uterus will greatly lessen menopausal symptoms after castration and maintain greater pelvic stability. Moreover the psychological effect on the patient produced by the knowledge that she still possesses a uterus is not to be underestimated.

HAROLD C. MACK, M.D.

Rongy A. J. Tamis A. and Gordon H. Uterine Bleeding. *Am J Obst & Gynec* 1936 31 300

An analysis and study of 1,048 cases of uterine bleeding led to the following conclusions:

Hysterectomy should be performed only in cases in which there are no local or constitutional contraindications. Patients who have definite metabolic disturbances and are overweight or who manifest cardiovascular derangements should not be subjected to hysterectomy, even if the uterus is larger than a three months pregnancy, as under such conditions the risk of the operation is too great. Curettage and the introduction of radium will stop the bleeding. In cases in which the hemoglobin index is 50 per cent or less the bleeding should be controlled temporarily by curettage and irradiation and a major surgical procedure deferred until the patient has sufficiently recuperated from the loss of blood.

Supravaginal hysterectomy is the operation of choice. It is definitely the safer procedure when performed by the average gynecologist. The cervical stump should be thoroughly cauterized before it is peritonized. The cauterization helps to cure the endocervicitis. In the cases of women over forty five years of age the tubes and ovaries should be removed. Many women with uterine bleeding have an insidious inflammation of the tubes or ovaries which, after manipulation, may become more acute and produce pain and tenderness in the lower portion of the abdomen for a long time.

Women with intramural or subperitoneal fibroids and enlargement of the uterus to about the size of a three months pregnancy should be treated by curettage and radium. Bleeding associated with fibrosis uteri can almost always be controlled by curettage and radium. Women in the fifth decade of life who have cervical polyps should be treated with from 800 to 1,000 mc hr of radium irradiation as a prophylactic measure against future bleeding.

Many such women have an associated fibrosis uteri which sooner or later causes menorrhagia or metrorrhagia. Vaginal plastic operations may be performed conjointly with the use of radium.

Small doses of radium given over a longer period of time are preferable to a large, highly concentrated dose. When small doses are used there is less danger of an intra uterine radium burn. The average dose used to control bleeding in the cases reviewed was about 1,800 mc hr. The smallest dose was 800 mc hr, and the largest 2,400 mc-hr. The dosage was varied according to the patient's age and the local condition.

The severity of the menopausal symptoms is about the same after removal of the uterus, the use of radium, and the removal of one or both ovaries from women over forty five years of age. To a large extent the symptoms of the artificial menopause depend upon the nervous stability of the patient. The use of radium is frequently followed by pain in the lower portion of the abdomen which last for from six to eighteen months. In the cases of patients suffering from submucous fibroids, or sloughing of the endometrium radium irradiation is definitely contra indicated.

Uterine bleeding of non malignant origin is probably the most frequent symptom the gynecologist is called upon to treat. No one method of treatment is applicable to all cases. Successful results depend upon proper interpretation of the clinical signs and symptoms, both local and general. The treatment should be that which is simplest or least dangerous to the patient's life. EDWARD L. CORNELL, M.D.

Terechoff, A. A. Clinical and Therapeutic Aspects of Utero-Intestinal Fistulas (Clinique et thérapeutique des fistules utéro intestinales). *Gynecologie*, 1936, 35, 15.

Utero intestinal fistulas are extremely rare. They are interesting especially from the point of view of their origin. Etiologically, there are three types, the traumatic, the inflammatory, and the neoplastic. Fistulas of the traumatic type are caused most commonly by obstetrical trauma such as that which may be produced by forceps and craniotomy. They may be caused also by gynecological operations, especially curettage. The most common cause of fistulas of the neoplastic type is advanced uterine carcinoma. Important causes of fistulas of the inflammatory type are tuberculosis, gumma and puerperal sepsis. All portions of the gastro intestinal tract, even the stomach, may be involved.

The author reports in detail a case in which a utero intestinal fistula followed perforation of the uterus during abortion and was demonstrated by roentgen examination. Under conservative treatment the fistula closed spontaneously. The author emphasizes that bed rest, the intravenous injection of urotropin, and the prophylactic administration of antistreptococcal and anaerobic sera are of the utmost importance in aiding the patient to combat infection and in bringing about spontaneous cure.

Surgical intervention is indicated only when spontaneous cure fails to take place and the patient becomes exhausted. Resection of the intestine, complete hysterectomy, and careful peritonization of the pelvis are then necessary for permanent cure.

HAROLD C. MACK, M.D.

Hamblen, E. C., and Thomas, W. L., Jr. Hyperplasia of the Endometrium. A Study of the Endometrium After Treatment. *South M. J.*, 1935, 29, 269.

After presenting a brief review of the literature on hyperplasia of the endometrium in which they call attention to the variation in the terms used to designate the condition and in the descriptions of the pathological changes, the authors discuss the functional level of the ovary and the anterior lobe of the pituitary gland and their interrelation, the mechanism of bleeding, the age incidence of endometrial hyperplasia, the association of the condition with other pelvic diseases, and its diagnosis. They review the treatment especially with regard to the so called conservative methods which include the administration of thyroid extract, estrin, the so-called anterior pituitary luteinizing principle of pregnancy urine, progesterin, and snake venom, and stimulative low dosage irradiation of the ovaries, pituitary, liver, and spleen.

They then report the cases of twenty seven patients whom they have followed for from two months to two years. These patients ranged in ages from fourteen to thirty four years. All of them had a typical "Swiss cheese" endometrium. During the various types of therapy, biopsy specimens were taken at frequent intervals in both the bleeding and the non bleeding stages. The authors believe that the "Swiss cheese" character of the endometrium is due to the lack of a luteinizing influence. In the cases of the younger women no corpora lutea were found in the ovaries, whereas in those of the older women they were found uniformly. The effects of the anterior pituitary luteinizing principle of pregnancy urine on the younger group, whose ovaries were quite sensitive, were an increase in the cystic degeneration and in the hyperestrogenism. Cessation of bleeding in these cases after such injections may be due to an increase in estrin formation allowing more adequate endometrial circulation or nutrition. It was suggested that the ovaries of the older women responded to the pregnancy urine extract by ovulation since, as there were few follicles to be stimulated, little estrin which might depress the function of the anterior lobe of the pituitary gland was formed. Ten patients were treated with the anterior pituitary luteinizing principle of pregnancy urine (Antuitrin S), six with gonadotropic antuitrin, the gonadotropic principle from extracts of the anterior lobe of the pituitary gland, seven with moccasin venom, two with thyroid extract, and two with progesterin (Progluton). Two received, in addition, low dosage X ray irradiation of the ovaries and pituitary gland.

The results were not uniform. They were best in the cases of the seven patients receiving snake venom. In these cases the bleeding was checked within from seven to fourteen days and no further excessive bleeding occurred during the course of the treatment. However, in three cases discontinuation of the treatment was followed by excessive hemorrhage which necessitated hysterectomy in two and radium therapy in one. Thyroid therapy was ineffective in two cases. In one of these progesterin stopped the bleeding in four days. One European rabbit unit was given daily for three days. In the other $\frac{1}{3}$ European rabbit unit was given from once to three times daily, for three days on two occasions without effect. Of the cases treated with the anterior pituitary luteinizing principle of pregnancy urine and of the six treated with antuitrin gonadotropic hormone the flow was decreased within five days in only two each.

Histopathological study of the endometrium obtained by curettage and by excision revealed an apparently more orderly and uniform arrangement of the interval glands in a number of instances, but in only one specimen were glands of the secretory pregestational type observed. The latter specimen was obtained from a patient who had received injections of 1 European rabbit unit of profuton (progesterin) daily for five days. The biopsy was done eight days after the first injection. One day after the biopsy an apparently normal menstrual period lasting four days began. ROBERT M. GRIER, M.D.

Williams, A. H. Fibroids and Abnormal Uterine Bleeding Treated by Roentgen Ray and Radium. An Analysis of 160 Consecutive Private Practice Cases. *Radiology* 1936 26 313.

The author discusses first the selection of cases of fibroids and menorrhagia for treatment by irradiation. This treatment is contra indicated in cases in which malignancy is suggested, cases of fibroids in which there are urgent pressure symptoms and those of young women with moderate menorrhagia or small fibroids who have reasonable hopes of future pregnancy. On the other hand large size of a fibroid in itself does not preclude the possibility of satisfactory results. Severe anemia is a disadvantage but not a contra indication.

The cases reviewed are grouped as follows:

1. Sixty two cases of abnormal uterine bleeding without a demonstrable fibroid in women under the age of the menopause.
 2. Fifty two cases of abnormal uterine bleeding with a fibroid less than 3 in. in diameter.
 3. Thirty five cases of abnormal uterine bleeding with a fibroid over 3 in. in diameter.
 4. Nine cases of uterine fibroids without bleeding in women who had passed the age of the menopause.
- The age and race of the patients and the duration and severity of the symptoms are tabulated. Various associated pathological conditions are mentioned. The type, average number, duration, and need for repetition of the treatments and the results are

reported, and the technique of the irradiation is described briefly. With few exceptions the cases were treated outside of the hospital. One hundred and forty one of the patients were cured and 12 were greatly benefited. Of the remaining 7, 4 went to operation before completion of the irradiation, 2 were not benefited by the irradiation, and 1 died of carcinoma a year later.

In conclusion, the author calls attention to the decreasing arbitrary limitation of contra indications to irradiation in cases of abnormal uterine bleeding and fibroids. They state that while hospitalization is usually not required for this treatment it may be necessary in complicated cases.

ADOLPH HARTUNG, M.D.

Murphy, W. T. Uterine Corpus Cancer. *Radiology*, 1936 26 178.

The author reviews 107 cases of cancer of the uterine corpus which were admitted to the State Institute for the Study of Malignant Diseases at Buffalo, New York. The cancers are divided into 6 pathological types based on cellular differentiation. Mentioned in order of ascending malignancy, the types described are: Adenoma malignum I, 9 cases; Adenoma malignum II, 76 cases; Adenocarcinoma A, 75 cases; Adenocarcinoma B, 20 cases; diffuse anaplastic carcinoma, 15 cases; and adenocarcinoma, 2 cases. Photomicrographs of each type are presented. The classification is similar to that of Healy and Cutler. The various types are analyzed by the author from the point of view of age, marriage, pregnancy, the menopause, symptoms, signs, treatment and results.

The average age of the patients was fifty eight and eight tenths years. The most constant complaints were bleeding (91.4 per cent of the cases), a discharge (42.1 per cent), and pain (28.4 per cent). Backache and urinary complaints were frequent in all types of cases. The difference in the figures for the various types are not striking. The author points out that the incidence of bleeding decreases, and that of other discharge increases the more highly differentiated the cancer. Pain could not be correlated with the extent or the curability of the disease. The duration of the symptoms was long, ranging in the different types of cases from one and one tenth year to two and three tenths years. The extremes were two weeks and eighteen years. The duration of the symptoms could not be correlated with curability. Analysis of data on marriage, pregnancy and the menopause revealed more evidence of functional deficiency in the cases of anaplastic cancer.

Of the patients who were not operated upon 89 per cent had enlargement of the uterus at the time of their admission to the Institute. There was no correlation of this enlargement with the pathological type of lesion. Extra uterine masses interpreted as metastases were found in 29.0 per cent. Their incidence decreased with increasing differentiation.

All of the patients were treated by irradiation with the X rays or radium or both. Sixty two had had a hysterectomy else here—17 a panhysterectomy and 45 a supravaginal hysterectomy. For the roentgen irradiation, a 200 Lv machine was used. The radium irradiation was given with a pack as well as by intracavitary and interstitial application. Details of the amounts and screening are reported, but no attempt is made to correlate the results with the type of lesion or the dose of irradiation.

In the 103 cases traced at the end of five years, the incidence of apparent cure was 25 per cent and the incidence of survival with or without disease 35.1 per cent. In the cases in which operation was not performed the incidence of five year cure was 27.2 per cent, and in those treated surgically it was 19.3 per cent. The cases of five year cure are analyzed in detail. Although the attempt is made throughout to compare the results in the cases operated upon with those in the cases not operated upon, the material does not permit a fair comparison of the results of irradiation with those of operation. However, it shows that the results are better the more highly differentiated the lesion.

Murphy concludes that functional abnormality of the reproductive apparatus existed in many of the reviewed cases, that curettage should always be performed to determine the histological type of the lesion, and that the treatment should always include irradiation. If hysterectomy is performed, it should be total and confined to the adenoma malignum types. He believes that curability is dependent less upon the sensitivity of the individual type of lesion to irradiation than upon the reactionary power of the host, the integrity of the myometrium, and the accessibility of the neoplasm to curettage and radium application.

DANIEL G. MORROW, M.D.

Brocq, P., Palmer, R., and Parat, M. A Cylindrical-Cell Epithelioma of the Uterine Cervix with Isolated Giant Cells and Bilateral, Voluminous and Early External Iliac Adenopathy. Radical Hysterectomy with Curettage of Celluloglandular Tissue in the Main Path of Spread and Resection of the Two External Iliac Veins (Epithéliome du col utérin, cyndrique à mégacelles indépendantes. Adénopathie iliaque externe, bilatérale, volumineuse et précoce. Hystérectomie élargie avec curetage celluloganglionnaire de la voie principale et résection des deux veines iliaques extérieures). *Mém. l'Acad. de chir.,* Par., 1936, 62, 345.

The cancer in the case reported by the authors was exophytic, small, and situated on the right side of the cervix. The parametrium was uninvolved, and the uterus was movable. On biopsy, the lesion was found to be a primitive adenocarcinoma or giant cell epithelioma made up chiefly of cylindrical or columnar epithelium showing quite atypical areas that contained isolated cells in a transparent stroma, many of which encompassed nuclear monstrosities. As the authors concluded from their previous expe-

nience that the growth would be apt to metastasize early, and as cylindrical cell cancers are relatively resistant to irradiation, they decided to operate.

At laparotomy, the uterus was freely movable, but the iliac glands of both sides were found enlarged and densely adherent to the iliac veins. The entire uterus, the cervix, the vaginal vault, the parametrium, the iliac glands, and short segments of both iliac veins were removed *en bloc*. The study of the specimen showed that the growth was confined to the cervix. The findings of microscopic examination were those presented by the biopsy specimen. The lymph glands contained an undifferentiated type of adenocarcinoma.

The patient made a good recovery. Several months later she was still free from recurrence and complained only of transient edema of the lower extremities.

The authors believe that all muciparous, carcinophilic, or cylindrical cell epitheliomas (from mixed or transition forms to well developed adenocarcinomas) are prone to be exophytic, tend to metastasize the iliac glands early (very often skipping the parametrium), and are relatively radioresistant. The form exhibiting isolated cells and giant cells, of which their case is an example, possesses these characteristics to an especially marked degree. For such lesions radical operation should be considered.

DANIEL G. MORROW, M.D.

Meigs, J. V. Carcinoma of the Retained Cervix or Subtotal Versus Total Hysterectomy. *Am. J. Obst. & Gynec.*, 1936, 31, 358.

In summarizing this article the author says that the most important considerations are the large percentage of nulliparas developing cancer of the retained cervix, the high incidence of fibroids in the series of cases reviewed, and the very low incidence of cancer of the retained cervix as compared with the incidence of such cancer suggested by the literature of today.

Conservative surgery should be the rule, and the life of the patient the most important consideration. There is no doubt, that total hysterectomy is a more formidable and more serious operation than simple subtotal removal of the uterus. The morbidity, the chance of injuring the ureters and bladder, the possibility of vaginal prolapse, and the foreshortening of the vagina in the young married woman all are against the routine performance of this operation.

The proper procedure in cases in which hysterectomy is required is careful inspection of the cervix with the patient in the lithotomy position, followed by curettage of at least the endocervix in the young and of the whole uterus in the old. If the cervix looks suspicious, it should be repaired or amputated, or a biopsy should be done, and no further operation should be performed until a frozen section has been made. If a pathologist is not available for the examination of a frozen section, it is better to wait three or four days for a laboratory report regarding

the presence or absence of cancer. The curettings should of course, be subjected to examination. If cancer is present, total abdominal or hysterectomy or radium irradiation, should be done. If cancer is not present subtotal removal of the uterus may be performed with assurance that it is the best procedure.

A diseased cervix should never be left untreated. It should be repaired or removed by amputation or total hysterectomy. Cauterization may be relied upon if it can be done thoroughly and deeply enough.

The author does not advise the routine performance of total hysterectomy, but advocates this operation for cases in which repair or amputation is difficult and cauterization is out of the question. He says that the performance or non performance of a total hysterectomy must depend upon the judgment of the surgeon and his study of the individual case. No dogmatic rules can be laid down. Too much criticism of subtotal hysterectomy and too much enthusiasm for the total operation will of necessity cause an increasing mortality and morbidity.

EDWARD L. CORNELL M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Douay, E. Results Obtained from Autogenous Ovarian Grafts (Résultats obtenus par l'auto greffe ovarienne). *Mém. l'Acad. de chir. Par.* 1936 62 439.

Douay presents a study of 128 cases in which grafting of autogenous ovarian tissue was done after hysterectomy with oophorectomy performed at the Broca Hospital in the period from 1929 to 1934.

In all of the cases the graft was taken either during operation from the removed ovary which was placed in a sterile towel or after operation from the ovary which was placed in a sterile dish. In the 60 per cent of the cases in which the graft appeared healthy the hysterectomy was done for fibroma cancer salpingitis or hematocele. When the ovary was small it was divided through its greatest diameter to make 2 grafts (68 cases). When it was large only a part of it was used each graft representing one fourth of the gland (9 cases). In 40 per cent of the cases the grafted ovary was pathological. In 25 it was infected in 13, sclerotic and in 5 sclerotic. In 3 cases there were bilateral ovarian cysts. In 5 cases tuberculous salpingitis was present but the ovary was free from manifest tuberculosis. The pathological grafts were well tolerated. In all cases bilateral grafting was done. In none was a graft expelled. The resistance and vitality of ovarian tissue are remarkable. The activity of the pathological grafts was no less than that of the normal grafts.

The grafting is simple and can be done quickly. A 2 cm. incision having been made in the inguinal region, Kocher forceps are introduced through the wound advanced obliquely downward and inward toward the labium majus to a depth of from 4 to 6 cm., and then opened to create a bed in the tissue

to receive the graft. The graft is then introduced to the bottom of the tract with the forceps, its oozing surface posterior. The operation is concluded by the introduction of a suture in the skin. It consumes only a minute.

With the graft in this region, it is quite easy to control its growth and condition and, if necessary, to cut it out. The implantation of a graft from the same ovary on each side increases the chance of success. Often the grafts function alternately one every other month. By the described route of implantation the graft is protected from infection through communication with the operative field.

After the operation the labia swell. A hematoma may form but is soon resorbed. In cases of hot painful swelling moist compresses will give relief. During the first months following the operation the graft may decrease in size. Castration symptoms develop in 65 per cent of the cases. The first signs of activity of the graft i.e. swelling of the graft and sensitivity of the region of implantation, usually appear from three to four months after the operation. However in about 8 per cent of the reviewed cases they appeared the first month and in 2 cases not until the twelfth month. Treatment with extract of the anterior lobe of the pituitary gland or ovarian extract will hasten the stage of activity. When 2 grafts have been implanted activity is usually bilateral and regularly alternative. Occasionally it is greater on one side than the other. In some cases it may be unilateral and occur every month or every two months. It may be accompanied by transitory swelling. The enlargement persists for from four to seven days and is followed by a period of resorption lasting for a week, the whole process taking from fifteen to twenty days.

As soon as the graft begins to enlarge the castration symptoms begin to subside. In 99 per cent of the reviewed cases more or less complete hormone equilibrium and sometimes even hyperfunction ensued. The improvement in the general condition resulting from such grafting is marked and greater than that obtained by the usual endocrine therapy. The graft must be placed so that it will be protected against pressure from the clothing and will not cause inconvenience in the sitting position or in intercourse. The patient must be informed of the monthly swelling or operation for a suspected pathological condition may be done.

If the swelling is annoying and excessive puncture and evacuation of the follicular cyst will prove beneficial. From 5 to 15 c. cm. of fluid may be withdrawn. In 13 per cent of cases there are periods of hypofunction with corresponding symptoms and in 12 per cent, periods of hyperfunction. Removal of the graft for excessive swelling produces castration symptoms. In 14 (11 per cent) of the reviewed cases the grafts atrophied without becoming active. In 14, activity persisted for from three to six years. In 20 for from two to three years. In 15 for from six months to two years and in 9 for less than six months.

The incidence of failure increased with the patient's age. Nevertheless the results were sufficiently encouraging to justify such grafting at the time of the menopause. Grafts implanted after hysterectomy for fibroma give less favorable results than those implanted following hysterectomy for carcinoma. The transplantation of an infected ovary is associated with little risk of infection. In 70 per cent of cases castration symptoms develop when the grafts cease functioning. Hormone therapy will relieve them and may even re activate the graft. Conservation of the uterus seems to favor vitality of the grafts.

The indications for transplantation of the ovary and the methods used in ectopic pregnancy, bilateral salpingitis, sclerocystic ovaries, and fibroma and cancer of the uterus are discussed.

EDITH SCHANCHE MOORE

MISCELLANEOUS

Wittenbourg, W. and Zlatmann, A. Postclimacteric Hemorrhages and Their Relation to Malignant Neoplasms (Les hémorragies post climatiques et leur relation avec les néoplasmes malins) *Rev franç de gynéc et d'obst*, 1935, 30, 1026.

In their discussion of vaginal bleeding after the menopause the authors consider only such hemorrhage occurring at least one year after the complete cessation of menstruation in a woman not less than forty six years of age. They review some of the previous literature on the subject, comparing the relationship between malignant and benign neoplasms as the causative factor. The reported incidence of such bleeding due to cancer ranges from 26 to 92 per cent.

The authors review 100 cases of postmenopausal bleeding which were treated in the period from 1923 to 1925. In slightly over half of these the bleeding occurred between the ages of fifty and sixty years. In 41 per cent it was due to cancer of the uterus or ovary. The great majority of the uterine cancers were in the cervix. Four per cent of the lesions were definitely precancerous. In 7 per cent of the cases the bleeding was due to benign tumors such as myomas of the uterus or cysts of the ovary, in 40 per cent, to hyperplastic and inflammatory lesions in the cervix and body of the uterus such as endometritis, cervical polyps with erosion, or pyometra, and in 4 per cent, to decubitus ulcers following prolapse. In 3 per cent the cause could not be determined.

The authors discuss the benign lesions producing such bleeding in detail. Because of the frequency of such lesions they disapprove of treatment by hysterectomy without curettage. They regard a useless abdominal operation as much more dangerous than several useless uterine curettages. Because of the frequency of cancer as a cause of such bleeding, they advocate careful dilatation and curettage with examination of the tissue by a competent pathologist. By this procedure they have been able to make an accurate diagnosis of the cause of the bleeding in 96.4 per cent of the cases in which such an examination was carried out. They are of the opinion that when curettage is done carefully, it is not associated with much danger. In the great majority of their cases it has been done without anesthesia.

The causes of the bleeding in 2,384 cases of postmenopausal hemorrhage collected from the literature are summarized in a table.

NATHAN A. WOMACK, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Sillrals M. Cases of Premature Separation of the Placenta in the Obstetrical Clinic of the University of Helsinki in the Period from 1919 to 1933 (Ueber die Fälle von vorzeitiger Ablösung der Placenta in der obstetrischen Klinik der Universität Helsinki während der Jahre 1909-1933) *Acta Soc. med. Fennicae Duodecim* 1935, Ser. B Vol. 23

Of 59,000 labors occurring in the Obstetrical Clinic of the University of Helsinki in the period from 1909 to 1933 premature detachment of the placenta occurred in 131 (0.2 per cent). In his discussion of the latter the author divides them into serious and mild cases according to the symptoms and subdivides each of these groups into the cases of primiparas and the cases of multiparas.

Sixty-seven of the cases were serious and 64 were mild. In the cases of primiparas serious symptoms usually developed only when at least one third of the placenta was detached whereas in the cases of multiparas such symptoms were frequent when only one fourth or one fifth of the placenta was detached.

The presence of a renal gestosis was demonstrated in 53 per cent of the severe cases and 33 per cent of the mild cases. If albuminuria is excluded these percentages are reduced respectively to 40 and 11. The large number of old multiparas suggests that in addition to changes in the endometrium the wearing out of the organism and especially of the heart and vessels is an important factor in the occurrence of detachment of the placenta.

Six of the mothers (8.9 per cent of those with serious detachment and 4.7 per cent of the total number) died. They were at the Clinic only from fifteen minutes to a few hours before delivery, and 5 of them died within from one to three hours after delivery. One survived for three days. Three of them were practically moribund when they entered the Clinic. In only 1 of the fatal cases was death due entirely to the premature detachment of the placenta and the resulting hemorrhage. In all of the others there was a complicating renal lesion. In several the renal lesion was chronic.

Of the infants in the serious cases, 56 (81 per cent) died. Seventy per cent of the latter were born prematurely. Forty-six (70 per cent) were dead before the mother entered the Clinic. Of the 21 which were alive when the mother entered the Clinic, 13 (62 per cent) survived. Of the infants which died at the Clinic, only 4 were viable.

Of the infants in the mild cases, 10 (15 per cent) died. Seven were dead before the mother entered

the Clinic and 3 died at the Clinic. Of the latter only 1 was viable.

The majority of the infants, especially in the serious cases, were males.

In serious cases of detachment of the placenta rapid evacuation of the uterus is indicated. The subsequent treatment depends upon the width of the cervical canal, the viability of the child, and other factors. At the beginning of labor, particularly in the cases of primiparas abdominal cesarean section seems advisable.

Rauramo M. Points of View Regarding the Treatment of Placenta Previa. An Analytical Review of 113 Cases (Einge Gesichtspunkte bei der Behandlung der Placenta praevia. Analytische Betrachtung von 113 Placenta praevia Fällen) *Acta Soc. med. Fennicae Duodecim* 1935, Ser. B Vol. 23

The author calls attention to the fact that the possibility of using different methods of treating placenta previa is dependent to a considerable degree upon the character of the cases and that in different institutions the various methods are employed in the various types of cases on the basis of quite different indications. It is therefore difficult to compare the results reported by different obstetricians.

He classifies his own material, 113 cases, into the following 5 groups:

Group 1. Spontaneous delivery, 40 cases (36 per cent).

Group 2. Version by the Braxton Hicks method, 17 cases (15 per cent).

Group 3. Version by other methods, 17 cases (15 per cent).

Group 4. Dilatation by the Wichmann method plus version, 23 cases (20 per cent).

Group 5. Abdominal cesarean section, 16 cases (14 per cent).

He discusses the cases of the fourth group in special detail particularly with regard to the indications for the dilatation. He is of the opinion that among cases of placenta previa with very severe hemorrhage there are some in which dilatation is both justified and advisable. Of the latter type are the cases of multiparas in whom the cervix is obliterated but the uterus is only slightly opened.

Cesarean section was done in cases in which the cervical canal was at least partly maintained (relatively often in primiparas). As a rule it was limited to cases without very severe hemorrhage or collapse and in which the child was alive and viable. The infant mortality was therefore relatively low.

In cases in which the patient has been rendered quite anemic by the hemorrhage, in many of which

the child is dead, internal version (sometimes preceded by dilatation) and even Braxton Hicks version is frequently indicated. Extraplacental version is preferable.

In 72 of the author's cases the placenta previa was partial and in 41 it was total. Spontaneous delivery occurred in 39 of the partial cases. Twenty-four of the 113 women were primiparas and 80 were multiparas. The total maternal mortality was 4.4 per cent, and the corrected maternal mortality, 1.8 per cent. The total infant mortality was 53 per cent. The mortality of the infants which were alive at the time the mother entered the hospital and which weighed more than 2,500 gm was 19 per cent. Renal gestosis (albuminuria, nephropathy, eclampsia, and eclampsia) occurred in 30 per cent of the cases. The ratio of male infants to female infants was 170:100. The course of the puerperium was extraordinarily good. Only 1 of the women remained in the hospital for any considerable length of time (twenty-three days).

Baird, D. The Upper Urinary Tract in Pregnancy and the Puerperium, with Special Reference to Pyelitis of Pregnancy. *J. Obst. & Gynec. Brit. Emp.*, 1936, 43, 1.

Pyelitis is one of the most common complications of pregnancy. In a period of two years it was found in 15.6 per cent of all patients admitted to the antenatal wards of the Glasgow Royal Maternity and Women's Hospital. It is as common as albuminuric toxaemia, contracted pelvis, and abortion. The most important predisposing factor is stasis of urine in the upper urinary tract. Stasis always precedes the onset of infection. The health of the patient is not an important factor in its development as it occurs most typically and in its most severe form in healthy young primigravidae. It does not appear to be associated with any particular physical type. In over 90 per cent of the cases the infecting organism belongs to the coliform group. Urinary infection in the absence of pregnancy is also most often due to coliform organisms.

There are 3 principal routes by which infection may reach the kidney—the blood stream, the lumen of the ureter, and the lymphatics. The majority of clinical workers in England believe that the organism is absorbed from the bowel and carried to the kidneys by the blood stream. Organisms were found in the blood in 2 cases of pyelitis of pregnancy. The author believes that if blood were taken for culture early enough in the disease, a positive result would be obtained, and that following intestinal disturbance organisms are absorbed into the blood stream and thereby carried to the kidney.

In the absence of pregnancy, acute pyelonephritis is usually bilateral. Three types of lesion are found in subacute and chronic pyelonephritis.

Type 1. The parenchyma is more involved than the renal pelvis. If the organism is of low virulence and the local resistance is good, fibrosis not unlike that occurring in non suppurative nephritis results.

If the fibrosis is diffuse it will lead to atrophy of the kidney, and if it is patchy, to irregularities of the cortex due to scars and retracted areas. Secondary calculus formation is common. There is only moderate dilatation of the calyces, as usually there is no obstruction to the outflow of urine.

Type 2. The renal pelvis is more involved than the parenchyma. In some cases there is obstruction at the ureteropelvic junction, and in others obstruction lower down. Changes in the wall of the pelvis of the kidney occur. There may be small nodules due to lymphoid infiltration, metaplasia of the epithelium and leukoplakia.

Type 3. The changes are of equal intensity in the renal pelvis and parenchyma. Destruction of the parenchyma with the formation of multiple abscess cavities occurs. There is an increase in the peripelvic fat invading the hilum and compressing the renal pelvis. The capsule of the kidney may be thickened and the perirenal fat adherent. The renal pelvis and calyces are dilated at the expense of the parenchyma. The dilatation is due either to obstruction to outflow or to atony of the wall of the ureter and renal pelvis resulting from inflammation.

The methods used to study the effect of infection on the urinary tract are chromocystoscopy, catheterization of the ureters, determination of the urea concentration of the urine of each kidney, McLean's urea estimation, and intravenous pyelography.

It is customary to divide cases of pyelitis of pregnancy into 2 groups, the acute and the chronic, according to the severity of the urinary symptoms. The condition is frequently wrongly diagnosed. Of 156 cases of pyelitis of pregnancy reviewed by the author, 98 (60.8 per cent), were diagnosed incorrectly. In some, the error was due to the absence of symptoms referable to the urinary tract, and in others, to the fact that the symptoms were so slight that they were not recognized. The most frequent erroneous diagnosis is albuminuria, and the next most common, hyperemesis. When acute pain and tenderness are present, the diagnosis may be in doubt as the condition may simulate pleurisy, pneumonia, or appendicitis.

In 78 of the 156 reviewed cases there was no fever. In 53 (34 per cent), fever was present for less than one week. Of the multiparas, 9.1 per cent, and of the primigravidae, 27.6 per cent, had fever for from seven to fourteen days. Six primigravidae but no multiparas had fever for more than three weeks. These findings show that the disease is more serious in primigravidae than multiparas.

The urine practically never becomes sterile before the end of pregnancy, and exacerbations during the course of pregnancy are common.

In the 127 unselected cases of pyelitis treated medically in which the result is known, there were 4 maternal deaths. One of the deaths, however, was due to cardiac disease. The mortality was therefore 2.3 per cent. In 192 especially selected cases there were 7 deaths, a mortality of 3.6 per cent. The stillbirth and neonatal death rate was 15.7 per cent in

the selected cases and 19.7 per cent in the selected cases. Of 132 primigravidas, 4 (3 per cent), and of 187 multiparas, 6 (3.2 per cent) died. The stillbirth or neonatal death rate was 23.7 per cent in the cases of primigravidas and 14.4 per cent in those of multiparas.

In all cases of pyelitis the patient is put to bed and kept warm but no attempt is made to induce diaphoresis. She is confined to bed until the temperature has been settled for a week. In the acute stages abundant fluids are given at least 100 oz in twenty-four hours in fairly small quantities at frequent intervals. A mixture of potassium citrate and sodium bicarbonate, 40 gr. of each is given every four hours night and day. When diuresis has been established a nourishing light diet is given. Liquid paraffin is given to obtain easy movement of the bowels. Drastic purgatives are contra-indicated. When the pain is severe morphine is given in the acute stages and antiplogistine is applied to the region of the affected kidney. If the patient becomes sick the amount of alkali is reduced or stopped. Reduction of the alkalies often stops the vomiting as alkalies are very nauseating to some patients. When the temperature has been settled for about ten days hexamine and acid sodium phosphate, 10 and 15 gr. respectively, are given 4 times a day.

There seems little doubt that the most important single essential in the treatment of pyelitis is an abundant fluid intake. If the fluid intake in a period of twenty-four hours is over 100 oz the acute phase of the attack usually does not last very long.

Hexamine liberates formaldehyde which in a dilution of 1:20,000 allows very few organisms to grow. However the liberation of formaldehyde is considerable only when the hydrogen ion concentration of the urine falls to 4.

A full light diet should be given as soon as possible. Patients are too often allowed to become anemic and thin from starvation.

Posture undoubtedly plays a part in many cases. Most patients suffering from pyelitis prefer to lie with the thighs well flexed as this position relaxes the psoas muscles and diminishes the compression of the ureters thus relieving the pain to some extent.

Ureteral catheterization is usually held to be contra-indicated in the acute stage of an infection but as obstruction to the outflow of urine by the pregnant uterus is of such importance in the production and persistence of urinary infection the author gave the method an extensive trial. The value of drainage by ureteral catheter is due to the relief of obstruction to the outflow of urine which it brings about.

The article includes a number of temperature charts, pyelograms, photographs and photomicrographs. J THORNWELL WITHERSPOON, M.D.

Vehta C. M. Eclampsia in Bombay. *J. Obst. & Gynec. Brit. Emp.* 1936 43 267.

In the period from July 1929 to June 1934, the incidence of eclampsia in 42,407 women in Bombay was 0.45 per cent. One hundred and sixteen of the

women with eclampsia were Hindus, 40 were Mohammedans, and 26 were Christians. One hundred and one were between the ages of fifteen and twenty years. The incidence of eclampsia was lowest before the sixth month of pregnancy and highest at term. It was highest also in primigravidas and decreased with increasing parity. Forty-one (21.3 per cent) of the eclamptic women died. A striking feature was the fact that between the ages of fifteen and twenty years, when the incidence of eclampsia was highest, the mortality was lowest, viz. 15.8 per cent.

The methods of treatment included the Rotunda method, the Stroganoff method, mixed methods, and the use of magnesium sulphate.

Of 95 women treated by the Rotunda method 66 were delivered spontaneously and 19 with instruments. A case in which cesarean section was done is reported in detail. The procedure in the cases of 10 women is not recorded. Labor was induced in 2 cases. Twenty-four of the mothers died. The fate of 3 was not recorded. The fetal mortality was 33.4 per cent. Calcium gluconate was given by injection in 8 cases. Two of these were fatal.

The Stroganoff method was used in 10 cases. In this group the maternal mortality was 30 per cent and the fetal mortality 66.6 per cent. Forceps were used in 1 case.

Mixed methods were employed in 38 cases. Three (7.9 per cent) of the mothers died. The fetal mortality was 42.1 per cent. In 9 cases in which forceps were employed there were 2 deaths. Labor was induced in 6 cases. One case of placenta previa was treated successfully. Mixed treatment gave the best results.

Magnesium sulphate was injected in 9 cases with 1 maternal death. The maternal mortality was therefore 11.1 per cent. The fetal mortality was also 11.1 per cent. Forceps were used in 4 cases and labor was induced in 2. In the 1 case in which venesection was done death resulted.

Of the 102 infants, there were no records for 13. Of the remaining 174, 103 (59.2 per cent) were born alive and 71 (40.8 per cent) were stillborn. Of the infants born alive 30 per cent died within the first ten days after birth.

J THORNWELL WITHERSPOON, M.D.

Albrecht H. Pregnancy with Essential Hypertension (Schwangerschaft bei essentieller Hypertonie). *Monatsschr. f. Geburtsh. u. Gynäk.* 1935 100 301.

The author first discusses previous reports on essential hypertension in pregnancy. He refers especially to the five cases reported by De Snoos all of which ran a favorable course. He then discusses the nature of essential hypertension. Kujin is of the opinion that the condition is the manifestation of a change of tonus in the sympathetic nervous system while Volhard attributes it to a disturbance of the regulatory mechanism of the blood pressure. Like all other sympathetic neuroses, it is intimately

related to disturbances of the endocrine system and is familial. In glomerulonephritis, as well as in nephropathy of pregnancy, there is first an increase in the tonus of the arterioles. In both conditions there is injury of the capillaries which favors elevation of the blood pressure and occurs before the renal damage. Therefore the hypertension of pregnancy is to be attributed, not to kidney damage, which often is not present or does not develop until later, but to the increased vasoconstricting irritation of the arterioles and capillaries caused by substances formed in pregnancy. The vasoconstricting substances are believed by some to be proteogenic amines, and by others, peptones. Toxins also exert a direct influence on the walls of the capillaries.

Whatever the basic cause the hypertension of pregnancy is due to vasoconstriction. Cholesterolin sugar, and urea have an irritating effect upon the small blood vessels, and, in addition, the amines and peptones exert a sensitizing effect on the arterioles.

The author reports five cases. The first was that of a primigravida forty one years old who was admitted to the hospital in eclamptic coma. Delivery was effected by cesarean section.

The second case was that of a woman who belonged to a family with numerous cases of hypertension. The content of albumin in the urine was 12 per cent. The patient suddenly collapsed. Premature detachment of the placenta was found, and cesarean section was performed.

The third case was that of a primigravida thirty-three years old who gave a family history of essential hypertension. The patient had visual disturbances and the content of albumin in the urine was 5 per cent. The blood pressure was 190. Cesarean section was performed.

The fourth patient had been under treatment for essential hypertension. Albuminuric retinitis was present, and the content of albumin in the urine was 16 per cent. Cesarean section was done.

In the fifth case the content of albumin in the urine was 10 per cent. A macerated fetus was delivered spontaneously.

Albrecht emphasizes the importance of early treatment, institutional care, and the administration of calcium, atropine with luminal, and theobromine.

He concludes that essential hypertension due to a disturbance of vasomotor regulation renders the prognosis of associated pregnancy unfavorable. The physiological increase of tone in the sympathetic and parasympathetic nervous systems and the combination of a change in the metabolism with an increase in the products of protein decomposition lead to increased irritation of the blood vessels and increased danger of damage to the capillaries. The development of the edemonephrotic and eclamptic syndromes is therefore favored. As the symptoms are more severe in every subsequent pregnancy women with familial hypertension should be kept under careful observation and given the indicated prophylactic treatment from the beginning of pregnancy.

(KRAUL) WILLIAM C. BECK, M.D.

LABOR AND ITS COMPLICATIONS

Kangas, T. Low Transverse Presentation (Ueber tiefen Querstand). *Acta Soc. med. Fennicae* Duo decim, 1935, Ser. B, 23.

The author reviews his cases of low transverse presentation at the Municipal Lying In Hospital at Wipuri. As at that hospital, a presentation is described as a low transverse presentation only when the head passes through the vulva with the sagittal suture in the transverse diameter, his material includes only thirteen cases. In the period from 1930 to 1934 the incidence of this presentation was only 0.2 per cent.

The causes of low transverse presentation are fairly numerous. This presentation seems to be most common in old primiparas. The shape of the maternal pelvis and the shape and attitude of the fetal head seem to play an important role in its occurrence. The head of the infant presenting in this position is often wedge shaped and flattened in the anteroposterior diameter. The author especially emphasizes the fact that in three fourths of his cases the head reached the pelvic floor slightly deflected, in the so called middle attitude. He believes that this anomaly of attitude is partly responsible for the failure of normal rotation to occur when the pelvic floor is reached.

In three of the reviewed cases of primiparas and three of those of multiparas delivery occurred spontaneously. In the remaining seven, Wichmann forceps were applied biparietally without difficulty in the anteroposterior diameter of the pelvis and extraction was accomplished with no noteworthy injury to the mother. All of the mothers and children were discharged in good condition.

Brémond, E. Version in Dystocia (La version dans la dystocie à hante). *Rev. franç. de gynéc. et d'obst.*, 1936, 31, 96.

In the period from 1926 to 1935, 257 cases of version were recorded in the Delmas Obstetrical Clinic. Of the 80 cases of bony dystocia, version was performed before the onset of labor in 30 and after the interruption of labor in 50. The maternal mortality was 1 per cent. The total fetal mortality was 33 1/3 per cent. In the cases in which version was done before the onset of labor the fetal mortality was 25 per cent. The maternal morbidity is not discussed, but severe complications occurred.

When the head is engaged or fixed the classical indication is not version but the use of forceps. Fixation of the head indicates merely the effect of contraction or uterine retraction pushing the head toward the pelvis in the same manner as it is pushed by the hands of the assistant.

The author rejects the theory that integrity of the membranes is essential for easy harmless version. Delmas recognizes amniotic infection due to premature rupture of the membranes as an indication for version. In 1 case version was done eight days after rupture of the membranes. Integrity of the

membranes does not assure the success of version. Often at the moment of rupture a violent retraction renders version impossible. The escape of fluid may favor the progress of labor.

The more or less marked hardness of the uterus which is usually found on intervention or which seldom fails to be provoked by intervention has been variously interpreted. It may be due to contracture resulting from cumulative contractions or to retraction of the uterine muscle after the factor causing it to stretch has ceased to act. In other cases it may be a rigidity of fatigue. Recognition of the cause is of importance in relation to the effects of general and spinal anesthesia. Spinal anesthesia acts perfectly on contracture which is the motor response of the cord to sensory stimuli from the uterus. Retraction which is controlled by autonomic ganglions is exaggerated by spinal anesthesia and diminished by adequate general anesthesia. On the rigidity of fatigue which constitutes a disorder of chemism perhaps with histological changes no type of anesthesia has an effect.

There is no clinical test for fatigue rigidity. Excessive frequency of contractions during labor is suggestive of reflex contracture. The chance of successful version seems to be greater after general than after spinal anesthesia. Distention of the inferior segment with ascension of Bandl's ring is less common than in shoulder presentations. Spinal anesthesia is indicated only in cases in which artificial dilatation is to be done before version. In some cases traction on the foot will engage the head. Traction on the other foot will then turn the fetus on its axis.

The only way to determine whether version is possible is to try it. The method is not dangerous if it is carried out gently and cautiously. Of 150 versions rupture occurred in only 1.

Among the numerous factors besides bone obstruction which may render delivery difficult are insufficiency or irregularity of the uterine contractions, resistance of the cervico segmental canal, and anomalies of fetal accommodation. Occasionally the fetal head slides laterally toward the iliac fossa. When this occurs version may improve its position. Marked asymclitism may be found. Version is indicated especially in cases of oblique oval pelvis in which the prognosis depends wholly upon orientation of the cephalic diameter in relation to the pelvic diameter.

A correct idea of a bony obstacle requires questioning of the patient, palpation and measurement of the uterine level, internal pelvimetry, and especially the Mueller Pinard test. Roentgenography will of course yield important information, but unfortunately cannot be carried out during labor. When the pelvic dystocia is so marked as to render passage of the fetus impossible surgery is necessary. Version is indicated in cases of slight fetopelvic disproportion with dilatation of the cervix and a soft tract in a multipara with a good previous obstetrical history.

EDITH SCHANCHIE MOORE

Hunt A B, and McGee, W B. *Duehrssen's Incisions*. *Am J Obst & Gynec*, 1936 31 598

The use of Duehrssen incisions is a rapid surgical method for completing the dilatation of the cervix when delivery is urgent and the cervix is the only obstructing factor. While its indications are reduced by better treatment in the first stage and the relatively greater safety of cesarean section it will remain of aid in a limited field. Its value in delivery from below in cases of prolonged labor with potential infection is obvious.

The authors review 592 cases in which Duehrssen incisions were made. The indications were (1) mechanical induction, (2) overterm pregnancy with a large baby, (3) the delivery of an elderly primipara, (4) occiput posterior and transverse positions, (5) prolonged labor with poor uterine action, (6) early rupture of the membranes, (7) borderline contraction of the pelvis and (8) difficulties of endocrine origin.

Placenta previa is a contra indication as is also dystocia due to malposition of the fetus, a large fetal head and a small pelvis.

Duehrssen's incisions should not be regarded as a substitute for cesarean section in cases of pelvic dystocia. Some of the patients whose cases are reviewed should have been subjected to cesarean section after the failure of a shorter test of labor. Duehrssen's incisions were directly responsible for death of the mother in only 1 or 2 cases. A high morbidity must be expected because of the nature of the cases in which they are employed. In the reviewed cases there were no deaths from puerperal sepsis.

Three incisions made to the fornix if necessary are recommended to prevent serious extension. Effacement i.e. dilatation of the internal os and retraction of the lower uterine segment is imperative before the incisions are made. Both the fetal and the maternal risk are greatly reduced if low forceps rather than midforceps or high forceps can be employed.

Of the reviewed cases, the end results of cervical healing were excellent in slightly over 50 per cent but somewhat disappointing in the remainder. Except in about 4 per cent of the cases in which such incisions are made the labors terminating subsequent pregnancies are quite uneventful as regards cervical dystocia. In fact they seem to be easier if cervical obstruction was the cause of the dystocia in the first labor. Duehrssen's incision leave no increased tendency toward abortion, miscarriage, ectopic pregnancy or reduced fertility.

EDWARD L CORNELL M D

PUERPERIUM AND ITS COMPLICATIONS

Schwarz O H, and Brown, T K. *Puerperal Infection Due to Anaerobic Streptococci*. *Am J Obst & Gynec*, 1936 31 379

The predominant part in the causation of puerperal infection is played by anaerobic streptococci.

The presence of these organisms in the vagina of a large percentage of women at term indicates that the infection is endogenous and develops only when conditions favor the growth of the streptococci. Infections due to ordinary pathogenic organisms, such as various strains of hemolytic streptococci and staphylococci, can be controlled by good obstetrical technique.

In the last eight years the authors have practically eliminated serious cases of puerperal infection due to anaerobic organisms by the use of vaginal instillations. Since 1930, there have been only three deaths on the service. Two of them were due to infection by the staphylococcus albus and one was the result of a mixed infection in which the hemolytic streptococcus was the predominant organism.

In conclusion the authors state that this report completes a ten year study which has been continued as a routine procedure and has definitely confirmed all the contentions of Schottmuller.

EDWARD L. CORNELL, M.D.

Hill, A. M. Post-Abortal and Puerperal Gas Gangrene. *J Obst & Gynec Brit Emp*, 1936, 43: 201.

The author reports 30 cases of gas bacillus infection of the uterus following pregnancy which came under his observation in a period of twenty-two months. In 22 cases the condition developed after abortion and in 8 after labor at or near term. In the former, the mortality was 32 per cent, and in the latter, 75 per cent. In analyzing 115 cases of fatal sepsis following abortion Hill found that 15.6 per cent of the deaths were caused by gas bacillus infection.

In 22 of the author's cases the clostridium welchii was isolated, and in 2, the vibron septique. These organisms were present either in pure culture or in association with aerobic streptococci, anaerobic streptococci, the bacillus coli communis, or the staphylococcus aureus.

The early recognition of gas bacillus infection is most important as treatment is of value only in the early stage of the condition. The significant clinical features in the author's cases of abortion were an evidently septic abortion with jaundice, a rapid pulse, hemoglobinuria, hemoglobinemia, anuria, and occasionally physometra. Some of the patients showed only jaundice without serological or urinary evidence of blood destruction. A rare clinical picture, which usually proved fatal, was metastatic gas bacillus infection of the skeletal muscles. There were also a few cases in which the bacteriological diagnosis was first made at autopsy. The vibron septique infection produced no classical clinical picture.

In the puerperal group of cases the symptoms were less definite. In the search for the source of the organisms, cultures were made of bacteria from the rectum of the patient, from floor dust, and from the hands of the medical attendants. The bacteriological study of the hands of the medical attendants was made after the hands had been washed and dried,

less often after they had been thoroughly scrubbed, and in 1 instance after thorough scrubbing and the putting on of wet sterilized gloves.

As a prophylactic measure the author recommends the administration of antitoxin in all cases in which a destructive obstetrical operation is performed and those in which gas bacillus infection is likely to occur. He states that a presumptive early diagnosis may be made from smears of the lochia and from the cervix or uterine cavity. In the treatment of his cases the first principle was elimination of the primary focus by curettage or hysterectomy. The second principle was hydrotherapy by the oral, subcutaneous, and intravenous administration of glucose in saline solution. Alkalies were also given. Another important principle was the combating of renal failure by intensive fluid, antitoxic, and alkaline therapy. In addition, blood transfusions were given.

A. F. LASH, M.D.

NEWBORN

McGrath, J. F., and Kuder, K. Resuscitation of the Newborn. *J Am M Ass*, 1936, 106: 885.

The frequency of fetal death due to asphyxia is difficult to estimate.

"Asphyxia neonatorum" is as descriptive a term for what occurs when a newborn child does not breathe properly as any that might be used. It is generally recognized that this condition is due to insufficient aeration or, more properly, insufficient oxygenation of the fetal blood. Undoubtedly many reactions and reflexes play a part in the excitation of the neurorespiratory system. The most evident, probably, is contact of air with the fetal skin and the mucous membrane of the airways. Other factors, such as heat, cold, gases, liquids, skin irritation, spanking, posture, and pain—in fact, any of the various known peripheral stimuli—may initiate respiratory activity in the newborn.

Henderson describes three types of asphyxia—the apneic, the acarbic, and the chronic. The apneic represents an intensive but brief deficiency of oxygen. The acarbic is characterized by a marked reduction of the alkali reserve of the blood secondary to insufficient carbon dioxide stimulation and may show an acid excess. The chronic is the condition resulting when the respiratory center is depressed by a chronic lack of oxygen.

In cases of respiratory failure due to causes of central origin the history and clinical picture are fairly obvious. Frequent factors are prematurity, prolonged labor, difficult or instrumental delivery, narcotics, prolapse of the cord, and congenital heart disease. Many of the babies may be saved. When respiratory failure is due to obstruction in the upper respiratory passages the chance of saving the life of the child is especially favorable. The frequency of obstructive material such as mucus, amniotic fluid, meconium, vernix caseosa, and epithelial debris in the respiratory passages is known to all obstetricians. Such material is almost always found on careful

microscopic study of the lungs of newborn infants coming to autopsy

Other obstructive factors requiring consideration are the adhesion of the alveoli in the solid fetal lungs before birth and the natural cohesive state of the bronchioles and bronchi. The infant lung expands by "opening like a fan" and the effort to maintain normal ventilation of the lung is not so great as that required to initiate expansion. The force required to maintain adequate expansion and normal breath excursions is estimated at from 8 to 10 cm of water. It is probable that the forced expiratory effect against a partially closed epiglottis such as that made when the baby cries contributes in large measure to complete dilatation of the alveoli. In the authors' opinion a maximum pressure of 25 mm of mercury can be used with safety in the resuscitation of infants. Because of the resistance and the capacity of the chest walls the likelihood of overdistention of the alveoli is very slight. The absence of evident lung trauma in the authors' cases coming to autopsy seems to indicate that more complete expansion and greater pressure would increase the success of treatment of asphyxia of the newborn.

Asphyxia of the newborn is easily recognized from absence or feebleness of attempts at respiration. Occasionally pulsation of the cord is not noted although the apex beat may be visible. The condition is the same whether the baby is cyanotic or white but white asphyxia usually presents the more serious problem.

Improved obstetrical care will lessen the incidence of fetal suffocation. There can be no doubt that prolonged labor particularly when the membranes rupture early increases the likelihood of the condition. Toxemia, difficult labor, instrumentation, the use of posterior pituitary extract or quinine, the frequent exhibition of sedatives either narcotic such as opium and its derivatives or depressant such as the barbiturates and allied drugs, tend definitely to increase the incidence of asphyxia. Occasionally an umbilical cord anomaly such as a knot or prolapse, or premature separation of the placenta is responsible.

The treatment of the condition is based on three fundamental factors:

1. Opening of the airways. All obstructions must be removed. Mucus, amniotic fluid, meconium and other fluid must be removed by aspiration.

2. Insufflation or distention of the lung alveoli.

3. Stimulation of the neurorespiratory center with carbon dioxide after its sensitivity has been increased with oxygen.

In cases of long labor, toxemia, premature delivery, or necrosis and all cases in which fetal distress is evident preparations for resuscitation of the infant are imperative. When possible, the first step should be the administration of oxygen and carbon dioxide to the mother early in the progress of the labor. At birth, gentleness in the handling of the baby is essential. Holding the baby by the feet with the head low and gentle stroking of the throat toward

the mouth will cause the expression of mucus or other fluid and reduce the chance of aspiration. During this time inspection will show the fetal heart impulse and rate. Mild patting of the soles of the feet or the introduction of the gauze covered little finger into the mouth and pharynx to remove mucus is occasionally attended by the onset of respiratory effort.

In the cases reviewed, lobeline was used with rather indifferent results. Coramine (pyridine beta carbonyllic acid diethylamide) and icoral (meta-oxynethyl diethyl amino ethylammonobenzol chlorhydrate + meta-oxyphephenyl propanolamine chlorhydrate) were not employed. While the latter stimulate the respiratory center with a perhaps less depressant action, they may induce excitation ranging from restlessness to twitchings and possibly convulsions. Needless to say no drug will assure the necessary clearance and patency of the air passages.

While methods of artificial respiration are of some value and should be employed under emergency conditions, it is necessary to emphasize their inefficiency and to stress their danger. Even mouth to mouth breathing may inflict serious injury. Methods of forced or positive pressure insufflation with mask and pump are unsound in theory and unsafe in fact. In the use of the many ingenious machines for automatic and continuous insufflation, rhythmic alternation of positive and negative pressure, the limitations and liabilities of such treatment must be borne in mind.

Apparatus of the Drinker type and the more modern pulmotor called a "resuscitator" are of value for prolonged passive respiration, particularly when in sufflation of carbon dioxide and oxygen is a feature of their use.

The method of resuscitation which has seemed most valuable to the authors is the technique of direct exposure intubation and the intratracheal insufflation of 10 per cent carbon dioxide and 90 per cent oxygen under measured pressure. When mild measures prove unsuccessful, aspiration of the pharynx and larynx should be done with the baby lying on its back on a table. It is not necessary for the head to be lowered to 15 degrees from the horizontal as recommended by Blaikley, and the head should not be extended over the edge of the table. With the infant type of direct vision laryngoscope the tongue is easily depressed and the larynx exposed. After quick removal of mucus from the pharynx with the small sucker the laryngeal tube should be introduced within the vocal cords and well into the larynx. The sucker then again being used to aspirate any contained mucus or other fluid. When it is ascertained that all obstructive material has been removed the laryngeal tube should be connected with the gas tube and insufflation begun. In the authors' opinion there is a distinct advantage in intermittent control of the gas intake and output. The attempt should be made to follow the rhythm after it has begun rather than to lead inspiration and expiration.

J. THORNTON WITHERSPOON, M.D.

Turunen, A. O. I. Cases of Intestinal Occlusion in the Newborn, and a Review of the Diagnosis and Treatment of the Condition (Einige Fälle von Darmverschluss bei Neugeborenen sowie ein Ueberblick ueber die Diagnose und Therapie des Leidens). *Acta Soc. med. Fennicae Duodecim*, 1935, Ser. B, Vol. 23.

The author reports eight cases of ileus in the newborn. In four, the nature of the condition was first discovered at autopsy. Of the four cases in which the diagnosis was made during life, operation was performed in two. All of the cases were fatal. Death occurred after from two to eight days. In three cases the cause of the ileus was a stenosis in the lower part of the small intestine, in two intestinal atresia, in two, volvulus of the small intestine, and in one, invagination of the small intestine. No malformations were found in any of the mothers. Two of the infants were children of the same

parents. The brother of one of the infants had a large diaphragmatic hernia.

In four cases the birth was premature. Of the four in which it occurred at term, cesarean section was performed in one, forceps were used in another, and the child was extracted in foot presentation because of prolapse of the umbilical cord in a third. The method of delivery in the fourth is not known definitely.

The symptoms of the condition are described. They differ somewhat from the symptoms of ileus in adults. In the diagnosis it is necessary to rule out several conditions occurring only in the newborn.

The operative procedures recommended as giving the best results are entero anastomoses, intestinal resections, and, in cases of volvulus, retorsion. When congenital adhesions are found in cases of volvulus they should be liberated to prevent recurrence of the volvulus.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Weller, G L Jr. Adrenal Insufficiency Resulting from Partial or Total Atrophy of the Adrenal Glands. Early Clinical Recognition. *Arch Int Med*, 1936, 57 275

The author believes that disturbances of adrenal function have hitherto been recognized only at relatively late stages. He reports two cases including the autopsy findings to stress the early manifestations of the disease. In these cases symptoms had occurred intermittently for three and eight years respectively. The chief symptoms general languor and disability interfered with the wellbeing of the patients and probably accounted for their decreased motor and cerebral activity. Gastrointestinal disturbances were significant. The author believes that particularly the vomiting was due to adrenal insufficiency plus the added stress of the catamenia. During the exacerbations of the insufficiency there was fever. Weller emphasizes the variations of abdominal pain and the symptoms referable to the central nervous system. Hypotension is constant but pigmentation is usually absent. The chief conditions to be ruled out in the differential diagnosis are psychoneurosis, neurasthenia, acute and chronic appendicitis and encephalitis. In the cases reported the symptoms were relieved during the exacerbations in all but the terminal stages by the administration of glucose.

DONALD K. HIBBS, M.D.

Baker W W and Colston J A G. The Surgical Treatment of Horseshoe Kidney with Special Reference to Division of the Isthmus. *J Urol* 1936 35 264

Baker and Colston state that operation on horseshoe kidneys simply for the removal of stones or to correct hydronephrosis must inevitably give unsatisfactory results in many cases as it is undertaken solely to relieve the result and does not affect the underlying cause. For permanent results division of the isthmus must be undertaken in all suitable cases. The authors discuss the etiology, symptoms and diagnosis of horseshoe kidney. To date only twenty four cases of symphysiotomy have been reported in the literature. To these the authors add two more. Their operative technique is as follows.

Exposure is obtained through an oblique lumbar incision. The incision is lengthened anteriorly for a slightly greater distance than in the usual kidney operation as satisfactory exposure of the isthmus is essential for successful results. The dissection is carried down through the muscles and transversalis fascia to Gerota's fascia. Before this structure is opened it is freed posteriorly to the vertebral bodies, laterally, and upward as far as the diaphragm by the

technique of Foley. This procedure is of the greatest value in securing more complete exposure of the kidney and the isthmus. Gerota's fascia is opened at the level of the posterior lip of the renal sinus, and the perirenal vesiments and Gerota's fascia are freed from the kidney by blunt dissection carried toward the midline. The kidney and its vascular pedicle are thus well and easily exposed. The reflected perirenal fasciae are then retracted toward the midline to protect the peritoneum, and as they are left intact in a single sheath can be utilized to close the renal fossa following the operative procedure. Exposure of the lower pole and isthmus presents the greatest difficulty in the operation. During this procedure special care is necessary as in this region the anomalous vascular supply is encountered. There should be no hesitation in ligating and dividing small vessels, but before any vessel of considerable size is divided the circulation in it should be interrupted for some minutes and the portion of the kidney which it supplies should be observed to determine the amount of kidney damage which would be produced by its ligation. After the isthmus has thus been satisfactorily exposed a slight depression and thinning of the tissue are noted in most cases. In some cases, the point of union is found to consist chiefly of fibrous tissue with very little renal parenchyma. Symphysiotomy should be performed at this point. On the other hand in some cases the lower pole is found fused, with little or no evidence of a notch. In such cases great care should be taken to choose a point where division can be done without injuring one of the lower calyces which in some instances run into the isthmus. Carefully made preoperative pyelograms should show the direction of the lowermost calyces clearly, and by reference to the pyelograms after the isthmus has been well exposed the line of incision may be made well away from the calyces. The use of a right angle stomach clamp greatly facilitates exposure and compresses the tissue in such a way as to facilitate hemostasis during the introduction of the mattress sutures of chromic catgut. After the mattress sutures have been inserted through the kidney on each side of the isthmus and fat or muscle has been applied beneath the stitches to prevent cutting of the kidney tissue and facilitate hemostasis, division of the isthmus with the electrocautery is done. By the use of the right angle clamp retraction of the other kidney and the stump of the isthmus across the midline before satisfactory hemostasis is obtained is prevented. After satisfactory division of the isthmus, control of the bleeding and removal of the right angle clamp the kidneys are allowed to retract. In some cases the introduction of a second mattress stitch through the ends of each stump and the application of fat and

muscle over the raw tissue may be advisable. The relations of the pelvis and ureter may then be studied. After the described procedure the kidney is so freely mobilized that pyelotomy can be conveniently carried out if a stone is found, and if some indication for a plastic operation on the uretero-pelvic juncture or the pelvis is presented such an operation can be done with the kidney in a more normal position.

Nephropexy on the exposed side is usually done to insure unobstructed drainage of the pelvis.

FRANK M. COCHENS, M.D.

Stirling W. C. Traumatism of the kidney. A Report of Twenty-Seven Cases. An Experimental and Clinical Study. *Brit J Urol*, 1936, 8:1.

Trauma to the kidney is not uncommon, and its incidence is likely to increase in the future. It is usually direct, but indirect violence may produce a number of renal injuries. Direct trauma includes injury from instrumentation and retrograde pyelography. Spontaneous rupture occurs in a previously diseased kidney.

The clinical picture of traumatic injury of the kidney includes shock, hematuria, pain and tenderness on the affected side, nausea, vomiting, a fall in the blood pressure, a low red cell count and hemoglobin, and a mass in the loin. If extravasation and infection occur, chills and fever accompanied by muscular rigidity and renal ileus develop after forty-eight hours.

Severe injuries with extensive and continued bleeding call for prompt surgical intervention.

Less severe injuries should be watched by plain roentgenography, blood pressure readings, blood findings, and intravenous or retrograde pyelography to determine their site and extent.

Other intra abdominal organs may also have been injured.

Conservative treatment with supportive measures and prolonged rest in bed will cure the majority of mild lacerations of the kidney. Injuries involving the pelvis require repair and drainage.

The kidney is the most frequently ruptured abdominal viscus and its injuries have the best prognosis.

ANDREW McNALLY, M.D.

Birdsall, J. C. The Symptomatology Renal Pathology, and Treatment of Nephroptosis. *J Urol*, 1936, 35:135.

The author reviews 150 cases of nephroptosis. He is convinced that the majority of patients with the condition can be saved many years of invalidism if a correct diagnosis is made early and treatment instituted promptly. He deprecates the opinion held by many general practitioners that nephropexy is usually unsuccessful.

He discusses the symptoms leading to the diagnosis, the pathological changes occurring in the kidney in cases improperly treated, and the types of cases in which nephropexy will give permanent relief.

The fixation and maintenance of the kidneys in their proper position has been variously ascribed to the shape of the fossæ, the perirenal fat, the blood vessels, the renal fascia, the peritoneum, contiguous organs, and the intra abdominal pressure. Gerota and Bonney believe that imperfect development of the renal fascia is the principal factor in movable kidney.

This fascia is intimately connected on its inner surface with the renal capsule by bands of connective tissue, and on its outer surface to various adjacent structures by the hepatorenal, duodenorenal, lienorenal, and phrenorenal ligaments. Any excursion of the kidney in its vertical plane beyond the normal 2 cm. places the organ in 1 of the 3 well recognized degrees of nephroptosis. There is no relationship between the degree of ptosis and the severity of the symptoms.

Of the cases reviewed, the mobility was of the first degree in 48, of the second degree in 61, and of the third degree in 41.

In all cases a bilateral pyelographic study was made. Ptosis of the right kidney was found in 76, of the left kidney in 28, and of both kidneys in 46.

Partial or intermittent obstruction causes the symptoms to be renal. Intermittent disturbance of the blood supply causes congestion and pain. Viscerovisceral reflexes produce gastro intestinal symptoms and neurological disturbances. Mechanical pull on the peritoneal attachments to the biliary ducts and duodenum may cause jaundice, and, not uncommonly, Dietl's crisis. Pain, which is the most characteristic symptom, varies from a dull ache to severe renal colic.

The pathological changes which occur are usually the result of secondary factors produced by obstructive interference with the outflow of urine or variations in the blood supply.

In the reviewed cases the most common pathological conditions of the kidneys were hydronephrosis, with or without infection, calculous disease, pyelitis, and infection.

The treatment is palliative and operative. The palliative measures consist of the correction of faulty posture, improvement of the general systemic tone, the application of a well fitted abdominal belt, binder, or corset, and cystoscopic treatment for the relief of nephrosis, pyelitis, and cystitis.

Operative treatment is advisable in all cases of marked ptosis and those of ptosis of mild degree in which palliative measures have failed.

In 34 of the reviewed cases another operation was performed prior to nephropexy. The most common previous operation was appendectomy.

Many operative procedures have been employed to fix and suspend the movable kidney. The authors emphasize the necessity of freeing the kidney and ureter from all adhesions and attachments and removing all perirenal fat from the new kidney bed. Three sets of triple mattress sutures are introduced through the capsule on the posterior surface of the kidney, the upper set being inserted through the

capsule of the upper pole of the kidney and the second and third sets through the capsule of the middle and lower poles. The kidney is then properly placed in its new bed and the fixation sutures are fixed to maintain this position. The upper set of sutures are brought through the intercostal muscle between the eleventh and twelfth ribs and the second and third below the twelfth rib and through the erector spinae muscles.

In 20 cases the kidney was found to be the site of such advanced destruction that nephrectomy was necessary but 57 cases of unilateral and 9 cases of bilateral nephropathy were treated by the described method of suspension. The end results were excellent in 73 kidneys.

Pyelograms with the patient in the erect position were made in 27 cases. In every case the position of the kidney was excellent and no advance of renal destruction was observed. Although many patients complain of vague pain for some time after the operation no abdominal support is necessary.

I LMER HESS M D

Gibberd G F Symmetrical Cortical Necrosis of the Kidneys *J Obst & Gynec Brit Imp* 1936 43 60

The diagnosis of symmetrical cortical necrosis of the kidneys has usually been made after death. Direct evidence that a patient may recover from the condition may be obtained by biopsy in the case of a recovered patient by autopsy when death occurs late in the disease after partial recovery of renal function and by histological examination of the kidney. Although the macroscopic appearance of the kidney in fatal cases usually suggests that the entire cortex is involved, histological study shows that this is not the case. Occasionally the lesions have been found so small as to be clinically negligible whereas in the classical examples of the condition they involve so much of the cortex as to prove fatal. It seems reasonable to the author to make a clinical diagnosis of symmetrical cortical necrosis under certain circumstances and not to abandon the diagnosis if the patient recovers.

The occurrence of anuria or extreme oliguria in the case of a patient with a severe toxemia of pregnancy particularly if the latter is associated with an accidental antepartum hemorrhage, is usually characteristic enough to establish the diagnosis. Another characteristic sign is the secretion of a small amount of blood stained urine in the initial stage of the disease as the result of the extreme congestion of the glomerular capillaries. Soon after the onset of the disease, when the acute congestion has subsided in the glomeruli which have escaped complete destruction the blood usually disappears from the small quantity of urine secreted subsequently. Therefore, unless this sign is looked for early it may entirely escape notice. The initial hematuria may be of aid in the diagnosis of a doubtful case of oliguria associated with a pregnancy toxemia. Absence of the initial hematuria is strong evidence against the

diagnosis of symmetrical cortical necrosis of the kidneys.

The author reports two cases of symmetrical cortical necrosis. The treatment of such cases can be divided into (1) operative treatment (nephrotomy or decapsulation), and (2) non operative treatment.

It is practically agreed that the primary cause of the necrosis is a disturbance of the vascular supply to the renal cortex. Whether this disturbance is due to a primary thrombosis, multiple emboli, arteritis or some other cause of vascular stasis, is undecided, but that it is essentially a primary vascular disturbance is practically undisputed. The circulation is certainly not cut off by mechanical compression. The vessels are not compressed but engorged. More over as the clinical picture, the biochemical changes and the histological picture all point to glomerular failure as the cause of the progressive uremia, pressure upon the tubules is not responsible for the urinary suppression. The author therefore doubts that nephrotomy and decapsulation are of value in the treatment of the condition, whether or not the intracapsular tension in the kidney is raised. He believes that operation may even be harmful as anesthesia still further embarrasses the already in competent glomerular circulation, and decapsulation must kill any narrow strip of renal substance which may be kept alive by minute vessels coming from the capsule.

In considering medical treatment, which may be helpful in assisting the natural recovery of the kidney it is essential to realize that there are present many glomeruli in which irreparable thrombosis of the afferent vessels has not occurred. So long as the patient does not die from uremia or a complication time alone will result in more and more recovery. The aim of treatment should therefore be to delay progress of the uremia until kidney function has recovered.

The rate of progress of the uremia may be influenced by controlling the amount of protein breakdown in the body and stimulating to the utmost the power of excretion in the few glomeruli not immediately affected.

Because of the rapid exhaustion of the carbohydrate reserves and the resulting use of the fats and proteins of the body a sufficient supply of carbohydrate food is essential. If vomiting makes a sufficient intake by mouth impossible 6 per cent glucose solution should be given by continuous intravenous drip throughout the early stages of the disease. Later, glucose solution should be given in large quantities orally until the blood urea falls rapidly, when a more varied carbohydrate diet may be given.

Diuretics which stimulate urinary secretion under physiological conditions such as urea, water and sugar, are indicated. In the administration of urea it is important to delay the uremia long enough to enable the glomeruli to recover sufficiently to respond to the stimulus of the high concentration of urea in the blood. Water should be given in the

form of 6 per cent glucose in 0.5 per cent saline solution. In addition to the slow administration of a 6 per cent glucose solution given for its food value, 50 c.m. of a 30 per cent glucose solution should be injected intravenously every eight hours to favor diuresis. The administration of alkalies by mouth and by rectum has also been recommended. Some times blood transfusion may be necessary for severe accidental hemorrhage. The latter is usually of the concealed type. However, as blood transfusion is occasionally followed by suppression of urine and may aggravate the condition already present, its indications must be clearly established. Urinary tract infections usually aggravate the necrosis.

LOUIS NEUWELT, M.D.

Couvelaire, R. Peritonitis of Pylororenal Origin (Des péritonites d'origine pyélorénale). *J de chir*, 1936, 47, 392.

The author reports three cases of peritonitis of pylororenal origin, reviews forty nine cases collected from the literature, and discusses the various clinical manifestations of the disease at length.

The renal origin of the peritonitis is usually some what obscure and often overlooked. Failure to recognize it may be due to too great haste in taking the history or to incomplete clinical examination. Frequently, however, its recognition is impossible before operation and even at operation the primary focus in the kidney may not be discovered. Therefore in cases of diffuse peritonitis it is important to remember that retroperitoneal organs (kidney, renal pelvis, ureter) may be the primary focus as well as intraperitoneal viscera, and the posterior abdominal wall should be explored when an intraperitoneal focus cannot be found. In peritonitis of pylororenal origin the perforation of a perirenal abscess into the peritoneal cavity is usually found. Such a perforation may occur from the anterior surface of the kidney with complete absence of the usual signs of a perirenal abscess. The pus is often odorless.

In the reported cases, drainage of the peritoneum or of the perirenal abscess alone was always followed by death. Recovery resulted only when both the peritoneum and the abscess around the kidney were drained. The results were best when nephrectomy was done in addition to drainage, but this is not safe unless the condition of the other kidney is known. Nephrostomy is therefore advisable.

MAX M. ZINNINGER, M.D.

Wells, C. Polycystic and "Unilateral" Polycystic Kidney. A Review of the Literature and Two Cases. One with an Intracystic Papilloma. *Brit J Urol*, 1936, 8, 22.

By the term "polycystic kidney" is meant a diffuse cystic change affecting the whole organ. This cystic change is a congenital condition. According to Kampmeier's theory, which is well supported, the cysts arise from the primitive tubules which constitute the "provisional" kidney in the fetus.

As the progress of the disease is slow, symptoms frequently do not become manifest until late in life.

The symptoms and signs include hematuria, pain which is progressive, dull, and aching, or severe because of complications, and the presence of an abdominal mass. Occasionally the condition is discovered at operation.

The disease is usually bilateral. Occasionally, however, intravenous or retrograde pyelography and palpation of the supposed normal side reveal no abnormality. Under such conditions the clinical diagnosis may be unilateral polycystic kidney. Although it cannot be concluded with certainty that the other kidney is entirely normal, operative measures may be carried out on the cystic kidney with safety.

Many surgeons do not exclude patients with polycystic kidney from well planned surgery provided the findings of renal function tests are fairly satisfactory.

The authors draw the following conclusions:

1. Operation on other organs may be undertaken with very little increased risk.

2. Operation on or removal of a kidney may be done with little increased risk provided the function of the other kidney is good.

3. In cases of extreme urgency with poor function of the other kidney, the risk is considerable but not prohibitive. The indications of extreme urgency are severe infection or injury, severe lumbar pain, and suspected malignancy.

4. The operative procedures range from simple exploration, puncture, or removal of the cysts to nephrectomy.

ANDREW McNALLY, M.D.

Delon, J. Malignant Tumors of the Kidney in the Child. An Anatomoclinical study (Tumeurs malignes du rein chez l'enfant. Étude anatomoclinique). *Arch d mal d reins et d organes génito urinaires*, 1935, 9, 655.

After reviewing the development of the kidney from the two bands of mesodermal tissue, the renal blastema or nephrogenic tissue, the author discusses the various theories regarding the origin of renal tumors. He then reports twenty five cases of malignant tumor of the kidney in children and presents photomicrographs of the neoplasms. He has made an exhaustive study of the literature on such tumors and lists all articles published since 1924. He states that lists of articles published prior to 1924 may be found following reports by Lubarch, Hinman, Kutzman, and Nevinsky. He draws the following conclusions:

1. Malignant tumors of the kidney in children are rare. They occur in both boys and girls, and with equal frequency in the right and left kidney. They are most common between the ages of two and four years.

2. Their diagnosis is generally easy. Only congenital hydronephrosis simulates them at times.

3. They are large tumors which invade the kidney and the adjacent organs.

4 They are usually formed essentially of more or less developed connective tissue and epithelial tissue both of which have their origin in undifferentiated cells. Occasionally they show smooth muscle fibers striated muscle fibers cartilage or bone.

5 Their structure seems to follow certain laws.

6 Their microscopic appearance is very similar to that of the embryonic renal blastema, of which they seem to be a malignant proliferation.

7 Their pathogenesis is easily explained by the multiple potentialities of the undifferentiated cells of the renal blastema. MARSH WILLIAM POOLE, M.D.

Rhodes J S. The Clinical Importance of Ureterocele. *J Urol* 1936 35 300.

Rhodes states that of 695 cases in which a cystoscopic examination was made at the Massachusetts General Hospital Boston a ureterocele was found in 13 (almost 2 per cent). He reports 3 of the cases of ureterocele in detail.

While the cause of ureterocele is not definitely known, Rhodes believes that the condition is usually due to congenital stenosis of the ureteral orifice with atony of the ureteral wall which in many cases is aggravated by infection or stones.

The symptoms are attributable to obstruction and infection, and are not characteristic. The diagnosis is made by cystoscopy and occasionally by X-ray examination.

The preferred method of treatment is the transurethral use of the diathermy current. When the ureteral orifice can be identified the use of a forked electrode is most satisfactory. The roof of the cyst should be incised longitudinally. Care must be taken to avoid incising the bladder wall at the base of the cyst. In cases in which the ureteral orifice cannot be identified a straight electrode is used to puncture the wall of the cyst. The wall may then be incised with a forked electrode. Fulguration of the wall of the cyst is not necessary. Simple dilatation of the ureteral orifice is usually followed by recurrence of the symptoms and therefore not curative.

FRANK M COCHENS, M.D.

BLADDER, URETHRA AND PENIS

Letcher H G and Matheson N M. Encrustation of the Bladder as a Result of Alkaline Cystitis. *Brit J Surg* 1936 23 716.

The authors report a case of intense alkaline cystitis with calcareous deposits covering almost the entire interior of the bladder. The patient was a twenty six year old woman in the early months of pregnancy. The urine from the kidneys was acid while the bladder urine was strongly alkaline. Repeated bacteriological examinations revealed absence of the urea splitting bacillus but yielded pure cultures of the bacillus coli.

The condition was completely cured by bladder irrigations with an acetic acid solution containing 2 drachms of acetic acid to a pint of water.

THEOPHIL P GRACER, M.D.

Begg R C. A Colloid Tumor of the Urachus Invading the Bladder. *Brit J Surg* 1936 23 769.

The case reported was that of a man fifty four years of age who gave a history of hematuria and the occasional passage of globular masses of material resembling apple jelly. During the periods when the masses were passed he experienced frequency and pain on urination.

On cystoscopic examination the bladder was found normal except for a projecting nodular tumor in the vault from which hung small masses of material like jelly. At operation the umbilicus urachus, and upper half of the bladder were removed. Sections of the urachus showed that all of the lining epithelium had been converted into a tumor but there had been no invasion of the fasciomuscular wall. A diagnosis of colloid carcinoma primary in the urachus was made.

THEOPHIL P GRACER, M.D.

Rabson S M. Leukoplakia and Carcinoma of the Urinary Bladder. *J Urol*, 1936 35 322.

Of 124 cases of leukoplakia of the urinary bladder collected from the literature the condition was associated with carcinoma in 18 and with sarcoma in 1. Thirteen of the carcinomas were of the squamous-cell type.

Rabson reports a case of leukoplakia and squamous-cell carcinoma, describing the gross and microscopic findings at autopsy in detail. He states that leukoplakia may be regarded as the result of a metaplasia of the vesical transitional epithelium and as a process intimately linked with the development of squamous cell carcinoma. It may exist independently or may precede or be associated with squamous cell carcinoma but its role has not been fully determined. The author summarizes the literature regarding its cause and its association with carcinoma of the urinary bladder.

FRANK M COCHENS, M.D.

Lazarus J A and Schnelder A D. Primary Carcinoma of the Female Urethra Treated by Complete Extirpation of the Urethra. *J Urol* 1936 35 235.

Carcinoma of the female urethra is relatively rare. The first case was reported by Boivin in 1833. Since then 149 cases have been recorded. Ehrendorfer cited local inflammation trauma fissures and scars resulting from childbirth as predisposing causes, but the etiology of the condition is still obscure. A relationship between urethral caruncle and carcinoma is extremely questionable, although trauma, to which many caruncles are frequently subjected because of their location may play a secondary role.

As in the vast majority of the cases on record the lesions were first discovered when they were far advanced and involved the entire urethra, it was difficult to determine with certainty the part of the urethra in which they originated. In 5 of 10 cases reported by Menville the lesion was in the anterior part of the urethra. It was Menville's impression that most of the lesions when found involve the

anterior urethra or the entire urethra. Since the majority of tumors have been squamous cell carcinomas, it is assumed that they arise from the ducts of the urethral glands. Occasionally, however, they are true papillary carcinomas, consisting of cylindrical cells. The neoplasms usually grow slowly, and when situated at or near the urethral meatus are subject to maceration and infection. In spite of their slow growth, they show an early tendency to metastasize to the external iliac, hypogastric, and sacral lymph nodes.

As is well known, carcinoma of the female urethra does not cause symptoms until quite late in its course. The outstanding symptoms are difficulty in micturition with at times complete urinary retention, dysuria, and hematuria. Increased urinary frequency is not a usual symptom. When it is situated at or near the meatus, the tumor can readily be seen.

When the lesion is situated at the meatus, examination reveals a more or less sessile, papillomatous tumor of hard consistency which shows a tendency to bleed easily. In cases in which the tumor is situated farther back in the urethra, it is possible to feel an irregular mass along the urethral wall, and when a urethroscope can be introduced it may be possible to visualize the growth. Biopsy clinches the diagnosis.

Since the majority of the cases are seen quite late in the development of the tumor, about one third of them present evidence of lymphatic involvement at the time of the first examination. The prognosis is poor.

The operation performed in the case reported by the authors was as follows:

Under spinal anesthesia a circular incision was made in the vestibule of the vagina around the urethral meatus, and by means of the electrical cutting needle the entire urethra was dissected out from its bed and cored from its sphincteric bed. It was then completely amputated from the bladder at the vesical neck. After its removal a catheter was passed into the bladder, a series of purse-string sutures were introduced around the vesical neck and in the tissues of the vaginal vestibule, and each suture was tied firmly to hug the catheter. The flaps of vaginal mucosa were then approximated around the catheter and the latter was sutured into the vaginal wall and the labia majora.

While several types of treatment have been advocated for this condition, it appears that the best procedure is complete excision of the growth, including the inguinal lymph nodes when they are involved and followed by thorough irradiation of the inguinal regions and the site of the tumor.

If complete extirpation of the urethra is indicated, this can be done without causing urinary incontinence.

The authors advocate the formation of a suprapubic fistula as a preliminary step to the complete extirpation of the urethra.

C. TRAVERS STEPTA, M.D.

GENITAL ORGANS

Walker, K. M. Treatment of the Malignant Prostate. *Brit. M. J.*, 1936, 1: 201.

While the treatment of benign prostatic hypertrophy with obstruction has made great progress in the past twenty years, the treatment of prostatic obstruction due to malignant disease is disappointing. This is especially unfortunate since it is found that from 13 to 25 per cent of prostatic enlargements are malignant. As in the treatment of carcinoma elsewhere in the body, the ideal treatment of carcinoma of the prostate would be radical removal with the scalpel. Walker cites the report of Young, an advocate of radical perineal prostatectomy, on fifty cases of carcinoma of the prostate in which the operative mortality was 8 per cent, thirty three of the survivors were alive and well five or more years after leaving the hospital, thirteen had survived seven or more years without a recurrence, and eleven died with metastases. The statistics of surgeons using the suprapubic route are generally less complete and appear to show less satisfactory results. However, in 1928, Marion pointed out that the ultimate results of the use of one route are as good as those of the use of the other for in neither the suprapubic nor the perineal operation can the lymphatics be well dealt with. Most surgeons agree that the radical operation yields disappointing results, and few are prepared to attempt it except in the earliest stages. While Mintz and Smith reported the finding of lymphatic spread in 60 per cent of cases at autopsy and Pasteau reports the incidence of lymphatic extension as 80 per cent, the opponents of radical operation point out that carcinoma of the prostate usually has a very slow growth, and it is by no means uncommon for patients relieved of obstruction to survive for a period of five years or more.

The author says that the secondary type of carcinoma, the prostate which was once benign and is now arousing the suspicion of malignancy, should be promptly extirpated. Recent statistics have shown that 14 per cent of benign enlargements undergo malignant change. Therefore if surgery were limited to such enlargements alone it would have an important place in the treatment of malignant disease.

As success in surgery depends upon early diagnosis, it is important to know the signs of early invasion of the prostate by malignant disease. The most important of these is the presence of a hard area in the prostate. However, as such an area may be a malignant deposit, a prostatic calculus, or a collection of distended acini surrounded by induration, an X-ray examination should always be made, not only to rule out the calcification of a benign nodule in the prostate, but also to eliminate the possibility of the spread of a carcinoma to the bones of the pelvis or the vertebrae. Anesthesia should be induced for the examination as it facilitates the study of a prostatic mass, especially if it is small.

Another sign of diagnostic importance is induration of the vesicles. While this may occur frequently

in association with a benign prostate its discovery should always be regarded with suspicion. A third aid in the early diagnosis of prostatic carcinoma the value of which has not yet been confirmed by others, may be the character of the expressed prostatic secretions. Mulholland states that in the prostatic smear from malignant disease there are found cells about two or three times the size of an ordinary polymorphonuclear leucocyte. These cells tend to occur in clumps, and are often so closely packed together that their outline is distorted.

It is usually the prostate with benign hypertrophy undergoing malignant change that is subjected to removal. In this type, infiltration of the capsule occurs later than in primary carcinoma beginning in the posterior lobe. When the prostate cannot be removed with the finger alone it can generally be removed by a combination of enucleation and dissection. Sometimes it is the difficulty in enucleation and the cartilaginous feel of the prostate that confirm what up to the moment was only a suggestion of malignancy. Under such circumstances every effort should be made to remove not only the entire gland but also the vesicles since extension to the latter structures occurs early in the disease. Moreover the capsule, which in such cases is difficult to remove completely, will often be the site of malignant infiltration. For the treatment of this residuum in the capsule both radium and deep X-ray irradiation may be used. As the introduction of either needles or radon seeds is attended by some difficulty and followed by only fair results the use of deep X-ray therapy should be prescribed as soon as the patient has recovered from the operation. In the treatment of inoperable carcinoma of the prostate surgery is limited to the relief of obstruction. The advances that have been made in transurethral resection for prostatic obstruction have given us a method of relief which has many advantages over the establishment of a permanent suprapubic drain. The objection has been raised that in carcinoma of the prostate transurethral resection may stimulate the growth of the carcinoma, but this objection is of only theoretical importance as it has not been proved by experience. Hemorrhage is less likely to be a factor of importance in this type of operation than in cases of benign enlargement. However the author believes that transurethral resection should be reserved for the scirrhous small prostate, and that for the larger type of prostate suprapubic drainage is preferable. In cases in which pain is severe and uncontrollable, often perhaps from invasion of the nerve trunks, it may be necessary to resort to resection of the presacral nerves and to chordotomy.

CLAUDE D HOLMES M.D

Christoffersen W G and Owen S E. Neoplasms in Cryptorchids. *Am J Cancer* 1936 26 259

Although the opinion has long been held that undescended testicles are especially prone to undergo malignant change, neoplasms in such testicles are rare. As in all malignant neoplasms of the testicle,

the prognosis of neoplasms of the undescended testicle is poor and the mortality high. report five cases of malignant undescended testicles. In all assay of the urine

In the past the prognosis of testicular atoma in undescended testicles was difficult and the prognosis correspondingly poor. By the time the growth was physically evident, it was usually so large and involved other regions and organs so extensively that the outlook was most unfavorable. The diagnosis was difficult even when the growth was located in the scrotal sac, where it could be studied more accurately. However, the differential diagnosis of all teratomas has become relatively simple since the recent adoption of the quantitative assay for Prolan A, the sex hormone of the anterior lobe of the pituitary gland, in the urine. Zondek, Ferguson, Cutler and Owen, and others have shown that teratoma is associated with an excessive output of prolactin in the urine. It has been demonstrated also that proper irradiation or surgical treatment of such tumors is invariably followed by a decrease while recurrences or metastases are associated with an increase in the prolactin in the urine. Occasional cases are found which seem to be resistant to treatment the prolactin either remaining fairly constant or increasing. Such cases always call for an extremely conservative prognosis.

While the personal and family history, especially as regards tuberculosis and syphilis is of value in cases of teratoma of the undescended testicle the usual signs of teratoma in the normally descended testicle are absent (Carlton, Wade). Such signs as swelling, a dragging sensation in the groin, edema of the legs, atrophy of the other testicle, and retraction of the penis, which characterize intrascrotal teratomas are not readily interpreted in cases of neoplasms of undescended testicles. An abdominal mass may be palpated and nodules may be demonstrable roentgenographically in the lungs, but other signs are likely to be misleading.

Survival for four years and longer has been recorded. Its reported incidence ranges from 1 to 6 per cent but the authors believe that not over 10 per cent of the patients live more than three years.

It is generally agreed that orchidectomy with or without the removal of the lymphatics along the inferior vena cava and aorta is the preferred method of surgical attack. With others, the authors believe that deep X-ray or radium therapy should be used from three to six weeks preceding operation. Rather full doses should be given. It is best also to follow operative procedures with additional irradiation when possible. Biological assay of the urine for prolactin is essential before and after irradiation immediately after operation and, in order to obtain a clear picture of possible recurrences and metastases and to determine the approximate rapidity of their growth at, at least, monthly intervals thereafter. Metastases are usually evident early and should be treated by irradiation.

When irradiation is indicated by the Prolan A findings and other evidence, the pre operative treatment consists, in general, of the administration of approximately 1,500 r to the tumor area. A complete course of postoperative irradiation may consist of approximately 200 r to the stump or the site of operation, 3,000 r to the abdomen, through both anterior and posterior fields, and about 3,000 r divided between anterior and posterior fields of the chest when this is indicated by the roentgen or other findings.

The division of dosage, the filtration, and the distance indicated vary somewhat with the individual case. The filtration employed in the authors' cases was 1 mm of copper and 2 mm of aluminum, the voltage, 200 kv, and the current, 25 ma. In the treatment of the abdomen and chest the target skin distance was 70 cm. The output was 14 r per minute, and the exposure about twenty minutes every second day. In the treatment of the stump or primary tumor area a target skin distance of 50 cm was employed with filtration by 0.5 mm of copper and 2 mm of aluminum. The output was 39.8 r per minute, and the exposure about ten minutes every second day.

Because of the obscure nature of tumors of undescended testicles early diagnosis has been ex-

tremely difficult. With the use of the quantitative Prolan A test it seems unquestionable that such tumors can be recognized in an early stage, long before marked clinical symptoms develop. The authors suggest that this test be used in all cases presenting a suggestive history. However, a positive finding is of less importance than the steady increase in the prolan output in these cases when they are untreated.

It is recognized that some of the teratomas of the mixed adult type may be extremely resistant to irradiation. An accurate histological classification should therefore be attempted, as it is well known that the seminoma group are relatively radiosensitive. A decrease in Prolan A following irradiation indicates sensitivity, although some cases of tumors which, according to the histological findings, should be radiosensitive, still show a high prolan test. Such cases always have a grave prognosis.

In following the patients after their discharge it is possible to utilize for assay specimens of urine sent by mail. Mailing tubes equipped with 3 oz bottles each containing 1 drop of tricresol as a preservative may be supplied to discharged patients at regular intervals. In this manner at least one type of check can be obtained on patients at a distance.

C. TRAVERS STEWART, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS MUSCLES TENDONS ETC

Hanke H Osteodystrophic Diseases and Their
Differentiation (Osteodystrophie Erkrankungen
und ihre Begrenzung) Deutsche Zeitschrift für Chirurgie
1935 245 641

The various diseases designated by the term osteodystrophia fibrosa must be differentiated clinically, roentgenologically and etiologically. This statement applies not only to the so-called generalized conditions—Recklinghausen's disease and Paget's disease—but also to osteodystrophia cystica juvenilis and the benign solitary giant-cell tumors which have been collectively termed localized osteodystrophia fibrosa.

The author doubts that there is a direct primary relationship between parathyroid tumor formation and Recklinghausen's osteitis fibrosa. Experiments carried out by him especially those causing a metabolic change in the sense of acidosis suggest the possibility of a primary metabolic origin of Recklinghausen's disease. If the condition is due to a metabolic disturbance, parathyroid tumors must be regarded as at first secondary, regulatory formations, which assume the apparently primary specific rôle in the disease only in the later stages. The importance of hypercalcemia must be estimated with great reserve in the diagnosis. However in the future also it will be advisable to break the assumed vicious circle by removing the parathyroid tumor.

Paget's disease in contradistinction to Recklinghausen's disease is not a true systemic bone disease. According to experience to date, there is no endocrine cause for the condition. The author reports for the first time the important observation of Paget's disease in four brothers which suggests a constitutional factor in this condition. Heredity must be studied in Paget's disease more carefully than formerly. The roentgenograms of the four brothers are presented. Although the calcium content of the blood of the 4 brothers was rather high the importance of determinations of the blood calcium in the differential diagnosis must not be overrated. Surprisingly determinations of Vitamin A in Paget's disease which were made by Schneider and Widmann showed a marked decrease to total absence. Therefore a deficiency of Vitamin A as a causative factor and the possibility of supplying Vitamin A in the treatment must be considered.

In so-called localized osteodystrophia fibrosa the solitary cysts (especially in the metaphyses of the long bones) and the solitary benign giant-cell tumors (especially in the epiphyses of the long bones) constitute disease entities which in the future must be differentiated also clinically more sharply than

heretofore. The etiological factors and the importance of trauma are not yet clear. It is unknown also whether the giant-cell tumors are formed by a resorptive reactive process (Lubarsch) or are true benign blastomas (Ewing).

Disturbances of calcium metabolism and parathyroid tumors have not been demonstrated even in the polyostotic forms of osteodystrophia cystica juvenilis (Schinz, Lohninger).

The treatment of solitary cysts as well as of solitary benign giant-cell tumors depends upon the site of the lesions. Because of the benign character of these formations mutilating operations are no longer justifiable. Limitation of the treatment to conservative surgical measures is also to be rejected. Modern plastic methods yield good results and are to be recommended especially for extensive cystic and tumor formations. Roentgen therapy should be employed only as a supplementary procedure and then only for giant-cell tumors. It should not be used for recurrences of such tumors.

The author reports five cases of juvenile cysts and one case of giant-cell tumor of the patella.

(HILDEBRAND) MANNING J. SEEVER MD

Compere E. L. Pathological and Biochemical Changes in Skeletal Dystrophies. An Analysis of the Results of Treatment of Parathyroid Osteosis. Arch Surg 1936 27 25

On the basis of the literature and the findings of investigations made by himself and his associates in a series of 14 cases in which the diagnosis was confirmed by the discovery of a parathyroid tumor at operation or autopsy, the author concludes that parathyroid osteitis must be regarded as a definite clinical syndrome. Osteodystrophia of this type is due to hyperparathyroidism associated with an adenomatous tumor of one or more of the parathyroid glands. It was found at postmortem examination in all cases, and at operation in nearly all cases which have been reported since it was first described by Mandl. It is a chronic progressive disease which is accompanied by pain, fractures and disabling deformities and may be fatal. Examination reveals generalized demineralization of the bones of the skeleton and frequently multiple foci of osteitis fibrosa with or without benign giant-cell tumors and cysts.

While local or regional osteitis fibrosa, osteitis deformans, osteogenesis imperfecta, osteomalacia, rickets and ankylosing polyarthritis are clinically, roentgenologically and pathologically somewhat similar to parathyroid osteosis, a difference in the biochemical manifestations of these conditions is demonstrated in studies of the mineral metabolism. Parathyroid osteosis is characterized by a high cal-

cium content of the serum, a low percentage of phosphates in the plasma, an increased excretion of calcium in the urine, and a negative calcium balance. It must be borne in mind, however, that hyperplasia of the parathyroid glands may be a purely compensatory enlargement resulting from a deficiency in the absorption of calcium from the bowel such as occurs in osteomalacia and rickets, in which the parathyroid glands are often greatly enlarged. The enlargement disappears when the calcium deficiency is corrected.

Clinical improvement following parathyroidectomy in cases of ankylosing polyarthritis has been reported, but in the author's opinion, a review of the cases fails to reveal a true adenoma of the parathyroid glands and the hyperplasia was compensatory. There have been no reports of parathyroid gland tumor in Paget's disease, and there is no conclusive evidence that this condition is due to hyperparathyroidism. Ballin classifies dyschondroplasia with parathyroidism, but biochemically there is no evidence to support this classification.

The characteristic symptoms and signs in parathyroid osteosis are progressive muscular weakness, pain in, or bowing of, the weight bearing extremities, and general lassitude. Osteoporosis is found in all cases. Turnbull described the microscopic pathological changes in the bones in detail. Lacunar resorption predominates. The other changes are fibrosis of the marrow and the formation of osteoclastomas and cysts in about 50 per cent of the cases.

Since parathyroid osteosis is the result of excessive secretion of the parathyroids due to enlargement and adenoma, the treatment should obviously consist first of removal or destruction of the tumor. As death has sometimes resulted from tetany, it is essential to leave at least 2 normal parathyroid glands intact. Experimental evidence indicates that improvement is obtained and the function of the normal parathyroid glands is not disturbed by roentgen irradiation. It is suggested, therefore, that this procedure may be a safe method of destroying the adenoma. However, it must be tried in a much larger series of cases before definite conclusions can be drawn. After ablation of the tumor, tetany may be prevented or controlled by the administration of calcium by mouth or intravenously, the injection of parathyroid extract, or both. The administration of calcium by mouth should be continued for at least 1 year, and the diet should include foods rich in calcium.

Early diagnosis and prompt removal of the parathyroid adenoma are desirable for the prevention of extensive damage of the kidneys.

RUDOLPH S. REICH, M.D.

Stookey, P. F., Scarpellino, L. A., and Weaver, J. B. Immunology of Osteomyelitis. *Arch. Surg.*, 1936, 32: 494.

The authors believe that susceptibility to osteomyelitis is dependent on the absence of immunological defense. Such defense is the chief factor in

susceptibility, acuteness, and chronicity, and may determine the mortality and the tendency toward recurrence.

This article is limited to a consideration of hematogenous osteomyelitis. In over 90 per cent of the cases of the condition the staphylococcus is the invading organism and is obtained in pure culture. Pigment producing strains predominate. In every case, osteomyelitis is at first a bacteremia. In the majority of cases the blood eventually sterilizes itself, the invading bacteria becoming localized in certain bones. If the infection is virulent and the body defenses are inadequate, multiple bones may become involved with re appearance of the bacteria in the blood.

Ninety per cent of the deaths occur in the first two weeks of the disease. This fact must be interpreted as indicating the lack of a defensive mechanism since after sufficient time has elapsed for the elaboration of immune substances, the mortality drops sharply.

Most observers concede that osteomyelitis develops subsequently to a minor abrasion or staphylococcal infection occurring in the skin. Of 71 strains of staphylococci obtained from patients with severe infections, 64 showed a demonstrable toxin. It can be postulated that invasion of the human body is due only to potentially virulent staphylococci of the cutaneous flora.

Investigations by the authors and others show that a free toxin is present in osteomyelitis and that many of the symptoms of the condition are attributable to a toxemia. Postmortem examination of patients dying in the first two weeks of the disease shows histological changes pointing to extreme toxemia.

The authors have studied the toxin forming properties of 27 strains of staphylococci obtained from cases of osteomyelitis. Of 20 cases, the staphylococcus was isolated in 27. Of the 27 cultures, 23 were hemolytic, 22 necrotic, 3 non hemolytic, and 5 non necrotic. If hemolysis is considered evidence of the formation of a toxin, these findings indicate that in 24 of the 27 cases of staphylococcal osteomyelitis the invading organisms were toxin formers. These organisms were obtained from persons with acute hematogenous osteomyelitis or an acute recurrence at the time of operation. No culture from draining sinuses was used in the study.

In experiments in immunization carried out with staphylococcus toxin on rabbits and other experimental animals, it was found that the laboratory animal requires approximately two weeks to develop an immune response to free staphylococcus toxin used as an antigen.

The beneficial results obtained in the treatment of acute osteomyelitis by the transfusion of blood from an adult donor may be due in part to the titer of staphylococcus antitoxin consistently present in the blood serum of the adult.

In a study made by the authors of the blood of 100 persons whose histories were unknown, the

staphylococcus antitoxin titer was found to average 1:16. In the measurement of the antitoxin of persons suffering from chronic osteomyelitis, the titer was found to be as high as 1:4,000, and the average many times the normal.

Commercial staphylococcus antitoxin now available for experimental use shows an antihemolytic titer approximately 700 times that of ordinary blood serum. A potent staphylococcus toxin will measure from 5,000 to 7,000 dermonecrotic doses per cubic centimeter. This antitoxin is the concentrated pseudoglobulin fraction of horse serum in which the immune substances are carried.

The high titer of available staphylococcus antitoxin immediately suggests the possibility of the therapeutic use of this antitoxin to obtain passive immunization. The fact that the immune titer of antitoxin is much higher than that of ordinary adult blood used in transfusion to combat toxemia and destruction of blood should indicate that this procedure is worthy of serious consideration. The pronounced early anemia so frequently observed is strong presumptive evidence that the invading organism is toxigenic and has marked hemolytic properties. The fact that the natural antitoxin does not appear in great quantities until after the second week of the infection and the fact that the majority of deaths from osteomyelitis occur in the first two weeks of the disease indicate that the optimum time for antitoxin therapy is early in the course of the infection. This is indicated also by the fact that material obtained at autopsy from patients dying early in the course of the disease and from rabbits dying from lethal doses of toxin shows marked toxic degeneration particularly in the heart, kidneys and liver. When once the blood stream has become sterile the process has become localized in the bone and the body defenses have reacted to the antigen there is little to be expected from the administration of antitoxin.

The possibility of active immunization by means of a staphylococcus tyroid has received some attention. The authors believe that the immune titer is definitely raised by this means.

NORMAN C. BILLOCK, M.D.

Green W. T. and Shannon J. G. Osteomyelitis of Infants. A Disease Different from Osteomyelitis of Older Children. *Arch Surg* 1936, 32, 462.

Osteomyelitis in children under two years of age has usually been considered a rare disease not essentially different from osteomyelitis in older children. According to the authors' findings in a review of 95 cases treated at the Children's Hospital, Boston, in the last twenty-nine years, this theory is incorrect.

The mortality in the entire series of cases was 21 per cent. In the cases of infants under six months it was 45 per cent, and in those of infants over six months and under two years of age it was 14 per cent.

Osteomyelitis is reported as being most common between the ages of eight and sixteen years.

According to the authors' experience the condition is not rare in the younger group of children. This is emphasized particularly by the fact that in the Children's Hospital, Boston, in which the age limit is twelve years, there were more patients under than over two years of age during the last two years. The authors are of the opinion that this does not represent the true relative age incidence but suggests that osteomyelitis in this group is not unusual.

In the 95 reviewed cases 121 bones were involved. The condition occurred in the femur in 48 cases, in the tibia in 18, in the humerus in 16, and in other bones in smaller numbers. Multiple lesions were present in 12 cases. In 3 cases there were 4 or more lesions.

In most cases the more rapidly growing end of the bone was involved. In only 12 of the 48 cases of involvement of the femur was the lesion in the upper end of the bone. In 7 the neck and in 3 the greater trochanter was involved. In the radius in which growth occurs chiefly at the lower end, the lesion occurred in the lower end in all of the 9 cases of radial involvement. In the tibia in which growth is a little more rapid at the upper than at the lower end the upper end was involved in 11 cases and the lower end in 7.

The relationship of antecedent extra-osseous infection was striking. In 52 (approximately 55 per cent) of the cases the occurrence of a preceding infection was proved either by a definite history or by the physical findings at the time of the patient's admission to the hospital. In 43 cases it was either doubtful or not included in the history. It is possible that in many instances the person recording the history neglected to inquire regarding recent infection.

Infection of the respiratory tract was present in 28 patients, approximately one half of the 52 known to have had an antecedent infection. Of these 28, 20 had a cold, bronchitis or a sore throat, 3 pneumonia with or without empyema, 2 otitis media and 3, infection of the respiratory tract and other abscesses. A history of antecedent infection of the respiratory tract was given in 30 per cent of the total number of cases.

In 13 cases one fourth of those with a known antecedent infection and approximately 14 per cent of the entire group, there had been antecedent cutaneous lesions. The lesions were furuncles in 4 cases, infected wounds, including burns, in 4, impetigo in 2, and paronychia and eczema in 1 case each.

In the cases of 4 patients in the first weeks of life omphalitis was present. Miscellaneous infections included measles (3 cases), chickenpox (2 cases), gonococcal septicemia of maternal origin (1 case) and congenital syphilis (1 case).

Five of the patients were suffering from acute rickets and 2 were mongolian idiots. As is well known the resistance of mongolian idiots to infection is poor.

Sixteen (17 per cent) of the patients gave a history of local injury of minor degree. Of these, 10 did not have a history of antecedent infection.

Of a series of cases in children from two to twelve years of age, the offending organism was the staphylococcus aureus in 91 per cent, whereas in the cases of infants, the streptococcus hemolyticus was by far the predominant organism. In 48 (63 per cent) of the cases there was a streptococcal infection. In nine tenths of these the organism was the streptococcus hemolyticus. Staphylococci were found to be present in 22 (30 per cent) of the cases. Of these, the staphylococcus aureus was present in all except 2. In the latter, the staphylococcus albus hemolyticus was found. In 3 cases the pneumococcus was present, and in 1 case the gonococcus was identified by smear and culture.

In 22 of the 25 cases with a history of antecedent infection of the respiratory tract in which a culture was made the osteomyelitis was due to the streptococcus. The pneumococcus and the staphylococcus aureus were present in 2 cases each.

In the 48 cases in which a culture of streptococcus was obtained there were 10 deaths, the mortality being therefore 20 per cent. In the 22 cases in which a culture of staphylococcus was obtained there were 7 deaths, a mortality of 32 per cent. Of the 23 infants under six months of age, 10 had a streptococcal infection and 6 (60 per cent) of these 10 died. Of 5 which had a staphylococcal infection, 2 (40 per cent) died. This suggests that streptococcal osteomyelitis is relatively more virulent in infants under six months of age than in older infants.

The early clinical picture of acute osteomyelitis in infants is not essentially different from the early clinical picture of the condition in older children. It is characterized by acute illness with the general systemic manifestations provoked by sepsis together with local pain and sensitivity of the involved part. The severity of the onset and subsequent illness is as variable as in older children.

In the reviewed cases the local findings recognized earliest were protection and muscle spasm. Tenderness at the metaphysis is not a reliable sign in children although, with patience, definite information regarding it may usually be obtained. In infants, local edema comes on more rapidly than in older persons and is much more diffuse. In fact, the entire extremity may be swollen from a process involving a single bone, even when the infection has not perforated the periosteum. While the swelling is usually maximal at the site of the lesion, it is often not localized enough to define the area involved.

The differential diagnosis may be difficult before roentgenographically demonstrable changes occur in the bone. The more confusing possibilities are sepsis of the joint and infection of the soft tissues. Scurvy with infection elsewhere and syphilis are less confusing. Rheumatic fever does not come into consideration in the cases of such young patients.

Roentgen examination is of more diagnostic aid in the cases of infants than in those of older children

or adults as in infants the lesions are visible at a somewhat earlier stage of the disease. Occasionally the roentgen demonstration of edema in the soft tissues is helpful. In the differential diagnosis roentgenograms may aid by demonstrating the distended capsule of a septic joint or suggesting the presence of scurvy or syphilis.

In 82 cases of acute osteomyelitis there were 18 deaths, a mortality of 22 per cent. Seventy-one of the 82 patients were operated upon. Of the 11 who were not treated surgically, 3 were moribund when they were admitted to the hospital and died almost immediately thereafter. Fifteen of the deaths occurred in the cases in which operation was performed.

The average period of hospitalization of the patients who recovered was six weeks. In only 6 instances was the patient admitted to the hospital more than once.

Sequestration was comparatively rare. Sequestrectomy was necessary in only 6 cases. These were the only cases in which gross sequestra were present but in 2 cases of osteomyelitis of the neck of the femur there was gradual absorption of the head after healing of the sinus.

The most common complications were lesions of other bones, sepsis of joints, pneumonia, and fascial and visceral abscesses. Twelve patients had lesions of more than 1 bone. Sepsis of joints occurred in 11—in 6, by apparent extension from an adjacent bone and in 2, as a metastatic lesion without evident involvement of adjacent bone.

Of the 20 patients who died, 10 came to autopsy. With 1 exception all of this group had demonstrable septicemia. Eight had multiple abscesses. The organs usually involved were the liver, heart, kidneys, lungs and skin. All but 1 had bronchopneumonia. This was particularly extensive in the 2 patients who did not have multiple abscesses. However bronchopneumonia is observed rather commonly at autopsy. In 1 case the pneumonia was considered terminal. Two of the patients with multiple abscesses had vegetative endocarditis.

The authors have been able to determine the present condition of 41 of the 46 patients still living who were treated on the orthopedic service. Only 2 present any evidence of residual osteomyelitis. In 1 of the latter the condition is recent and healing is taking place. In the other there are no symptoms. In all but 1 of these patients the deformity was due to involvement of a joint. In many of the cases of extensive destruction during the acute process evidence of the original lesion can be found in roentgenograms only with difficulty, and in several not at all.

The contrast between the picture of the disease in younger and older children is emphasized further by the relatively brief duration of the disease in infants, with rapid healing, infrequent sequestration and rarity of recurrence.

With regard to treatment the authors classify the reviewed cases into 2 groups. 71 cases in which

operation was performed and 11 cases in which the treatment was non surgical. The first group included 37 cases in which drainage of the bone was done by a surgical procedure directly on the bone and 34 cases in which it was established indirectly without surgical attack on the bone itself. In the first of these subgroups there were 7 deaths and in the second 8.

The authors believe that in cases of osteomyelitis of the neck of the femur in children the patient should be kept under careful observation a conservative attitude should be taken and surgery may frequently be avoided.

They ascribe the differences between osteomyelitis in infants and osteomyelitis in older persons to certain anatomical and physiological features of the bones.

Rather than operate on the patient at the earliest possible moment particularly when the site of the lesion cannot be definitely localized or operation is contra indicated by the general condition the authors immobilize the part usually with poulticing and give general supportive therapy. Almost without exception the children have shown improvement under this regimen. When once the site of the lesion is definitely recognized and the child is considered a good surgical risk or there is no possibility of improving his condition further without surgery operation should be considered.

In the authors cases the wound is packed with petrolatum gauze and the part immobilized in a beveled plaster cast. Dressing of the wound is delayed until granulations have formed usually from seven to fourteen days after the operation, in order that it may be accomplished without trauma. After the formation of granulations dressings are done at about weekly intervals with replacement of the petrolatum gauze until it can no longer be introduced.

In 20 cases treated in this manner there was only 1 death—that of an infant three weeks old with primary ophthalmia staphylococcus aureus septicaemia multiple visceral abscesses and involvement of 6 bones.

NORMAN C BULLOCK MD

Jessop W J E Generalized Osteitis Fibrosa
Irish J M Sc 1936, 122 59

In generalized osteitis fibrosa there is hyperactivity of the parathyroids associated with hyperplasia resulting in excessive parathyroid secretion. Under the influence of the excess of parathyroid hormone calcium salts are mobilized from the skeleton and the bones suffer loss of strength resulting in deformity and spontaneous fractures. Roentgen examination of the bones reveals a generalized lack of density and localized cyst formation. On examination of an involved bone after its removal the cysts are visible and the bone can often be cut easily with a knife. Microscopic examination shows that the bone has been replaced by fibrous tissue. There is considerable osteoporosis. The arrangement of the osteoclasts and osteoblasts pre-

sents evidence of absorption and new bone formation. These two processes often proceed in an irregular manner, and the new bone rarely shows a normal arrangement of the haversian systems. The amount of calcium in the blood and the excretion of calcium salts, especially in the urine, are increased. The necessity for maintaining osmotic equilibrium in the kidney leads to polyuria accompanied by thirst. The effort of the organism to bring about a compensatory increase in new bone formation results in an increase in the concentration of phosphate in the plasma.

The disease is most common in women between the ages of thirty and sixty years, and is often accompanied by weakness loss of weight a hypochromic anemia and much pain and tenderness in the bones or joints. Pronounced changes are found in the skull which becomes enlarged with prominence of the forehead. On roentgen examination the calvarium is found thickened and mottled the outline is indefinite ('fuzzy') with poor definition of the outer and inner tables. In some cases a tumor of the mandible is a striking feature. Deposits of calcium salts are often found in other parts of the body. When situated in the renal pelvis ureter, or bladder they have sometimes been the cause of the initial complaint. Diffuse deposits of calcium in the renal cortex may be shown in the roentgenograms. Impairment of renal function may accompany such deposits or occur in the absence of deposits or calculi. Siffert noted that the proportions of calcium and phosphorus in a renal calculus removed in one of his cases were almost identical with those in bone.

The dramatic improvement which follows removal of the parathyroid tumor is striking. The blood calcium falls almost immediately, often so rapidly that symptoms of tetany supervene and require treatment by injections of calcium gluconate calcium chloride or parathyroid extract. The blood phosphate rises more slowly. The excessive excretion of calcium stops within a few days. The pain and tenderness in the bones cease. Anemia and muscular atony are corrected and strength and weight are regained rapidly. Bone cysts may decrease in size and no further spontaneous fractures occur.

The total number of cases recorded to date is variously estimated at between 50 and 100 but the higher figure probably includes many cases in which the parathyroid enlargement was found after death and atypical cases in which slightly enlarged or normal parathyroids were removed. While the finding of a parathyroid tumor at autopsy is significant the most perfect demonstration of the relationship of such a tumor to the bone condition is the dramatic improvement which follows removal of the neoplasm during life.

The author reviews 25 cases collected from the British and American literature and reports the clinical chemical, roentgen, and postoperative findings in 3 cases of his own.

Although the disease is primarily a general disturbance of calcium metabolism and in isolated instances bone changes may not be prominent, in the great majority of cases marked skeletal alterations are the outstanding abnormality. The condition must therefore be differentiated from localized osteitis fibrosa, Paget's disease, multiple myeloma, osteomalacia, rickets, the osteoporosis of Graves' disease, and senile osteoporosis.

In cases of localized osteitis fibrosa there is no increase in the serum calcium or the calcium output, and the plasma phosphorus and phosphatase are found to be normal.

In Paget's disease the serum calcium, plasma phosphate, and calcium excretion are normal, but the plasma phosphatase is always very high. Histological examination of the bones shows porosis with simultaneous absorption and deposition, but these processes proceed more slowly than in generalized osteitis fibrosa. Newly formed trabeculae show a preponderance of lamellar over woven bone and a great excess of small fibril systems.

Osteomalacia is characterized by pain and deformity of the bones. The serum calcium in this condition may be normal or low. Tetany is not uncommon. The plasma phosphate may be low or normal, and the phosphatase may be high. The calcium excretion on a diet low in calcium may be normal. Histological examination shows great thickness of osteoid zones in spite of diminished osteoblastic activity. This is due to defective calcification. The disease is the result of deficient absorption of calcium due to a lack of Vitamin D in the diet, and is cured by sunlight or the administration of irradiated ergosterol or cod liver oil and an adequate diet.

Rickets will generally be ruled out by the age of the patient. In all cases the findings of chemical, roentgenological, and histological examination are characteristic.

In the osteoporosis of Graves' disease the serum calcium and calcium excretion may be high, but the serum phosphate is normal. Histological examination reveals osteoporosis without fibrous tissue formation. The differential diagnosis is aided also by the classical clinical symptoms of Graves' disease and an increase in the basal metabolic rate.

NORMAN C. BILLOCK, M.D.

Vogt, H. The Hematology of Certain Bone Diseases. Marble Bone Disease of Albers Schoenberg. Osteitis Fibrosa Generalisata of von Recklinghausen. (Zur Haematologie der Knochenkrankungen. Marmor-Knochenkrankheit Albers Schoenberg, Osteitis fibrosa generalisata von Recklinghausen.) 1935. Königsberg. 1. Pr. Dissertation.

Diseases of bones frequently influence the marrow. The marrow cavity may close completely or the marrow may be changed to fibrous tissue. As the marrow is the site of the formation of erythrocytes, granulocytes, and thrombocytes, there is a possibility that the peripheral blood picture

may be affected. The relationship between the metabolism of minerals and the blood picture has been studied by Hoff who came to the following conclusion: "The acidotic tendency of the acid base metabolism is accompanied by a myeloid tendency in the blood picture whereas the alkalotic tendency is accompanied by a lymphatic tendency in the blood picture."

The marble bone disease described by Albers Schoenberg in 1904 is manifested in the roentgenogram by a uniform shadow which shows scarcely any structure. The condition is characterized by extreme brittleness of the bones. Its cause is disputed. It has been ascribed to a disturbance of the calcium metabolism, an increase in the phosphorus content of the serum, and hyperfunction of the parathyroids. Inbreeding predisposes to it.

The author reviews thirty five cases collected from the literature. These showed a wide variation in the erythrocyte picture, the count ranging from normal to an anemia of 960,000 cells. The differences in the leucocyte count were less marked. The total leucocyte count does not exceed 10,000. Frequently there is a deviation toward the left. The anemia is explainable by a shrinkage of the marrow cavities and a decrease in the blood supply to the marrow. Especially Lorey and Reye are of this opinion. Reiche believes that the blood and bone changes are the manifestations of a common disease. The influence on the formation of leucocytes is counteracted by an extraordinary compensatory extramedullary myelopoiesis. This is indicated by the enlargement of the spleen. On the other hand, there is the record of a case with high grade anemia in which splenectomy led to improvement. The author divides the cases into two groups. In one are those with severe blood changes and a splenic tumor, and in the other those with slight blood changes and no enlargement of the spleen. He reports a case of his own which belonged to the first group.

In osteitis fibrosa, in which, as is well known, the normal fat and blood forming marrow is replaced by fibrous tissue, there is usually a slight anemia. Evidences of irritation of the bone marrow are nearly always absent. The leucocytes show only slight changes. Of the twenty two cases of this condition which are reviewed by the author, the values were normal in thirteen. Marked increases in the leucocytes could be explained by complications. The disagreement between experimental findings, the findings to be expected theoretically, and clinical observations is perhaps explained best by Hoff, who said: "In the study of blood regulation it is a frequent observation that brief and marked deviations from the normal permit recognition of changes at first conforming to law, whereas in long continued disturbances of regulation, because of numerous compensatory changes and counter-regulations apparently occurring under such conditions, no definite conformity to law can be recognized." (NESTMAN) 1 TO A. J. J. NAE, M.D.

Perras T The Experimental Production of Osteodystrophia Fibrosa with Parathyroid Hormone and Its Relation to Vitamin D (Ueber experimentelle Erzeugung von Osteodystrophia fibrosa mit Nebenschilddrüsenhormone und ihre Beziehung zum Vitamin D) *Arch f path Anat* 1935 296 212

The experiments reported were carried out with the parathormone of Collip on rats from four to five weeks old in which osseous development and growth had not yet been completed. The animals were divided into four dietary groups. One group was given a normal diet, another a diet rich in Vitamin D, the third a diet poor in Vitamin D and the fourth a diet poor in Vitamin D and calcium.

In the production of osteodystrophia fibrosa with parathormone in the rats on a normal diet, catabolism was dominant at first and an acute resorption of bone occurred as the result of the appearance of osteoclasts in large numbers. When an overdosage of the hormone was given there was an excessive washing out of calcium which probably was closely related to the abnormally increased osteoclastic activity. In this therefore is to be seen the cause of the osteodystrophic changes associated with fibrosis of the marrow. When the treatment was continued there began as a sort of reaction to the loss of the old anabolic tissue an abnormal development of osteoblasts. As these were not all used in a physiological manner fibrous marrow formed. When this disturbance became extensive it eventually led to increased catabolism. These findings were similar to those in osteodystrophia in man.

When the diet contained an excess of Vitamin D the influence of the vitamin was neutralized or even changes which suggested beginning osteodystrophia occurred on the administration of a smaller or larger amount of the parathormone.

A deficiency of Vitamin D in the diet led to a considerable sensitization toward the effects of the hormone.

When the diet was deficient in Vitamin D and calcium two chief types of porosis occurred alternately—a hyperostotic and a hypostotic type. During these brief experiments which were continued only over a period of from twenty three to thirty five days cyst formation and hemorrhages were not observed.

(HELLNER) LOUIS NEUWELT M.D.

Kuentscher G The Importance to Surgeons of Demonstrating the Direction of Stresses in Bones (Die Bedeutung der Darstellung des Kraftflusses im Knochen fuer die Chirurgie) *Arch f Klin Chir* 1935 182 489

This article is a detailed report of determinations of the stresses in mechanically burdened bones. In the author's opinion the theory of Meyer and Culmann that the course of the osseous trabeculae in the neck of the femur corresponds to the trajectories of stress in a statically burdened crane with a bend similar to that of the neck of the femur is not correct

as mathematical computation of stress is possible only for the most geometrically simple bodies.

Kuentscher attempted to determine the stresses acting on bone by a method which is used in the building of aeroplane motors at the Maybach Motor Works. This method is based on Hooke's law that distortions are directly proportional to the forces producing them. The distortions of bones which are very minimal were determined directly on the bone by means of a coating of resin. As the resinous material adheres very closely to the surface of the bone and has little elasticity it tears at the points where distortions occur. The tears are vertical to the direction of the greatest elongation. Even under a slight load the bone becomes covered by a network of distortion lines which represent an exact delineation of the distorting forces. The sites where the first lines appear are the sites of the greatest stress (the apices of stress). The intensity of the force may also be determined by this procedure. The method shows the stresses only on the surface but as the bones may be conceived of as hollow cylinders they are favorable objects for its use.

Attention is called to the fact that homogeneity of the bone substance is a prerequisite for exact determination of the course of stress from pressure, extension and torsion. Functional homogeneity of the bone was proved by the fact that in all of the experiments a uniform direction of the force such as would be possible only in a homogeneous mass was demonstrated. This observation justifies the application of Hooke's law to the bones. The bone substance has apparently the duty as well as the ability to preserve the described homogeneity and to restore it after it has been destroyed. Only maximal burdening has an influence on the structure of the bone. This maximal burdening is the dynamic demand of the moving body. Next in importance is the dynamic influence of the entire cross section of muscle. By the two forces the bone is burdened in its long axis. It is not so burdened by the pull of an individual muscle as the latter does not produce a maximal force such as that described.

Bone is very sensitive to demands made upon it by continued pulling and pushing forces exceeding certain limits. To these it reacts with the formation of the decalcification zones of Looser. The Looser zones are formed chiefly in bones which have been weakened by disease. They appear exactly at the sites of the greatest pulling stresses. This has been definitely proved experimentally. It is thus that the extensive zones of destruction in rickets and chondrodystrophic bones occur. The decalcified zones occurring in the ulna at the level where the radius was sawed through experimentally by Bier and Martin are explained by the author as follows. The method of demonstrating the lines of distortion shows that these decalcified zones develop at the apex of the stress which, in the experiments cited were just about opposite the sawed area in the radius. As the radius and ulna are firmly coupled to each other mechanically they acted as a unit in

that the sawed area acted as a notch with the apex of the stress in its base

(VOGELER) JOHN W BRENNAN, M D

Spackman, E W The Roentgen Aspects of Chronic Arthritis 1m J Roentgenol 1936, 35 156

The roentgenologist must be familiar with the pathological changes associated with arthritis before he can intelligently interpret the roentgen findings in that condition. He should be acquainted also with the clinical history of the particular case before he attempts to classify the changes seen in the roentgenograms. The classification of the American Committee for the Control of Rheumatism divides the non specific types of arthritis into two general groups, the atrophic group, also called "proliferative," "rheumatoid," and "ankylosing" arthritis, "arthritis deformans," and "Still's disease," and the hypertrophic group, also called "degenerative" and "non ankylosing" arthritis and "osteo arthritis."

The atrophic type usually begins before the age of forty years. Its onset may be acute and suggest acute polyarticular rheumatic fever. The phalangeal joints or knees are first affected with pain and swelling, and there is an early loss of muscle tone. Persons of the slender ptotic type are particularly susceptible, and there is often a history of physical depletion or fatigue and circulatory disturbances. In the hypertrophic type, which occurs usually in middle aged or older persons, there is often a long history of vague joint pains or stiffness, and slight trauma may suddenly aggravate the symptoms. An acute stage with recurrence is less likely than in the atrophic type, and the general health is good. The distal phalanges may be involved by nodular swellings for years before medical attention is sought. Pain and limitation of motion are the main symptoms. The muscle tone is good, and circulatory changes are less common than in the atrophic type.

In both types the changes seen in roentgenograms may be divided into early, intermediate, and advanced changes, but the degree of the joint changes seen in the roentgenogram may not correspond to the duration or the severity of the symptoms. This fact is of considerable importance in the diagnosis and prognosis. In the earliest stages the changes are only in the soft tissues, but may be brought out in roentgenograms by proper technique. The author summarizes the roentgen findings in atrophic and hypertrophic arthritis as follows:

ATROPHIC ARTHRITIS

Early Stage

- 1 Rarefaction of the trabeculated ends of the bones
- 2 Preservation of the zone of provisional calcification
- 3 Irregularities of the zone of provisional calcification
- 4 Homogeneous haziness throughout the joint space

5 First, widening, and later, narrowing, of the joint space

6 General fusiform swelling of the soft tissues, especially in the immediate vicinity of the joint

7 Occasionally, small spicules of calcium deposits about the joint margins

Intermediate stage

1 Atrophy limited to the bone ends, advancing into the shaft, and presenting a ground glass appearance associated later with secondary disuse atrophy of the shaft itself

2 Gross irregularity of the zone of provisional calcification with narrowing and destruction in small areas

3 Contact of two adjacent zones at various points with preservation of the lighter areas which represent unabsorbed cartilage islands

4 Complete fusion of the zones, forming a single line of increased density

5 Obliteration of all remains of the joint structure with firm ankylosis of the bones

6 Thickening of the periarticular tissues in the immediate vicinity of the joint

7 Small calcium deposits about the joint margins which can often be differentiated from bony spurs

Advanced stage

1 Generalized atrophy throughout the bone structure

2 Complete or partial disappearance of the zone of provisional calcification and sometimes enlargement of the punched out areas in the immediate vicinity

3 Deformity of the bone ends due to softening and "telescoping"

4 Continuity of the trabeculated bone which crosses from one bone end to the other

5 In many cases, continuity of the cortex and marrow structures forming a continuous shaft

6 Little or no remaining periarticular thickening or generalized soft tissue swelling

7 General atrophy of the affected muscles which are attached about the vicinity of the affected joint

HYPERTROPHIC ARTHRITIS

Early stage

1 Small osteophytes about the joint margins

2 Narrowing of the joint space

3 Slight tilting or a change in the alignment of the bones

4 Thickening of the proximal zone of increased density

5 Irregularities of the bony articular surfaces

6 Broadening of the circumference often causing apparent flattening of the joint surfaces

7 Secondary atrophy of the "honeycomb" type

Intermediate stage

1 Well formed spurs

2 Obliteration of the joint space

3 Subluxation of the bones

- 4 Irregular thickening of the zone of provisional calcification in some areas and thinning in others
- 5 A saw toothed appearance of the articular surfaces and punched-out areas
- 6 Broadening of the circumference and the formation of Heberden's nodes
- 7 Advanced secondary atrophy often involving nearly the entire shaft

Advanced stage

- 1 Large irregular spur formations
- 2 Gross irregularity of the joint space caused by obliteration and deformity secondary to erosion
- 3 Marked subluxations with disturbance of the alignment of the axes
- 4 Eburnation of the bone proximal to the joint space
- 5 Punched out areas and gross deformity with one bone fitting into the irregularities of the other
- 6 Marked broadening of the circumference
- 7 Advanced secondary atrophy with occasionally bending of the bones

CHESTER C GUY MD

Matolcsy T von The Diagnosis and Treatment of Tumors of the Ilium (Diagnose und Behandlung der Darmbein-geschwulste) *Arch f Klin Chir* 1935 184 52

In their early stages tumors of the ilium are often diagnosed as lumbago rheumatism or muscular strain. Roentgen examination will show that the condition is a bone lesion but in the early stages it is impossible even by such an examination to determine whether the process is inflammatory or neoplastic or whether it is malignant or benign. Therefore biopsy is necessary in every case. The author does not believe that this aggravates a tumor. In many cases only histological examination will reveal the nature of the growth. Matolcsy regards a relationship of bone tumors to trauma as very doubtful. He agrees with Verebely that to establish such a relationship it is necessary to have roentgen evidence that the bone was normal before the injury was sustained. Such proof is rarely available.

The only primary malignant tumor of bone is the sarcoma. Metastatic carcinomas in bone are common. Saidl has found 60 primary sarcomas of the ilium. Dickson has observed 80 chondromas and a few more exostoses and osteomas which are benign. At the Verebely Clinic 163 cases of tumor and inflammation of the ilium have been observed in the last ten years. In 20 the condition was a tumor in 7 osteomyelitis and 136 tuberculosis. Among the 20 tumors there were 11 sarcomas 3 osteomas 4 chondromas 1 brown tumor 1 hypernephroma and 1 echinococcus cyst.

The author reports in detail and with 5 roentgenograms, 1 case each of osteoma, chondroma, echinococcus cyst, brown tumor, sarcoma and hypernephroma. He states that osteomas and chondromas must always be operated upon as they are resistant to irradiation. Brown tumors also are best

treated surgically. Several patients operated upon for brown tumor by Verebely have remained free from recurrence for from nine to eleven years. As some brown tumors react well to irradiation Verebely believes that many supposed sarcomas which have responded favorably to irradiation were brown tumors. Of the sarcomas, only the periosteal fibrosarcomas which have not penetrated into the soft tissues are operable. The osteogenic sarcomas should not be treated surgically as operation on such neoplasms is always followed by local recurrence. Sarcomas of the flat bones are much more malignant than sarcomas involving tubular bones about 40 per cent of which may be cured. However irradiation of such tumors is followed by temporary improvement. (FRANZ) LEO A JUCKE MD

Cotton F J Foot Statics and Surgery *New Eng Land J Med* 1936 214 353

The weight bearing line through the tibia to the triangle of support in the foot must not be off center if trouble is to be avoided.

The trusses in the foot which support the arches are more important than the arches themselves. The function of the foot depends more on the moving tarsus which is controlled by muscle balance and muscle training to maintain the balance. The relation of the function of the long peroneal to the mobile function of the first toe unit is too often disregarded. The astragalus fits into a cup produced by the scaphoid cuboid and os calcis. The latter rocks in and out with some rotation.

The author is opposed to the use of plates. He prefers modified shoes and heels for young children until they are old enough to cooperate with exercises to restore muscle balance and proper function.

In some cases of flat foot changing of the statics by operative measures and muscle training is beneficial.

The short heel cord causes metatarsal strain and dropping of the anterior arch with associated metatarsalgia. These conditions can be relieved by proper pads and exercise of the flexors of the toes. The ascent of the first metatarsal is corrected by osteotomy through the first cuneiform and retention of the dorsal gap by the insertion of a small wedge of bone.

Injury of the astragalus with deformity usually requires arthrodesis of the tibio-astragaloid joint for relief of the pain. Old ankle fractures with dislocation are corrected by osteotomies and restoration of the relations of the tibio-astragaloid joint.

In cases in which the astragalus is driven up into the tibia resection of the relatively elongated nodule or arthrodesis with static correction may be required.

ELVEY J BERKHEIMER MD

Hermudsson I The Etiology of Koehler's Disease of the Tarsal Navicular Bone (Zur Aetiology der Koehlerschen Krankheit des Os naviculare tars.) *Acta radiol* 1936 16 68

The author reports what he believes to be the first cases of Koehler's disease in which a roentgen ex-

amination was made immediately after the trauma held responsible for the condition. At that time the scaphoid bone appeared entirely normal, but in the course of the next month the typical Koehler syndrome with clinical symptoms developed in spite of continuous protection of the foot. Ultimately the lesion disappeared completely. The author believes that trauma was definitely proved to be the cause of the lesion in this case.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC

Paltrinieri, M., and Logroscino, D. A Clinical and Experimental Study on Methods of Heat Therapy in Diseases of the Joints (*Saggio clinico e sperimentale sui metodi di termoterapia delle malattie articolari*). *Chir. d. organi di movimento*, 1935, 21: 303.

There is at present an increasing use of heat therapy in general practice together with a comparative arrest of research on its scientific basis. The authors present a comprehensive discussion of the principles of heat regulation, the physiological and therapeutic effects of heat, and the historical evolution of thermotherapy, and describe the various methods used in such therapy. They then report their observations on the diffusion of heat in the various forms of apparatus and their experiments on rabbits and man with the Bier method. In their opinion this method is by no means outmoded; it should be used increasingly because of its simplicity, efficiency, and safety. There are, however, considerable variations in heat distribution within the box. In light baths the temperature is more nearly uniform, sweating is greater, and the general reaction is well tolerated. Electrical bakers give a uniform distribution of heat, but the systemic reaction they produce is disagreeable. The authors believe that a greater intensity and wider distribution of heat to the deep tissues are attained by external application than by diathermy, and without injurious effects. External heat is entirely harmless when applied in connection with anesthesia and operative procedures.

The authors' experiments on animals were concerned with the general reaction and intra-abdominal temperature during Bier treatment of the abdomen. The temperatures were determined by a Zondek depth thermometer or a maximum thermometer sutured in the peritoneal cavity. In animals not subjected to anesthesia or laparotomy the intra-abdominal temperature was 38.8 degrees C. and the average rise produced by baking was 2.8 degrees. Immediately after the treatment the viscera showed intense uniform congestion but no lesions.

The authors studied also the local and general reactions of seventy-three patients undergoing the Bier treatment for various affections of the bones and joints. They used the Lycos dermatherm and the Putti Casuccio and common maximum thermometers.

Each reaction followed a definite and characteristic curve. The average rise in the skin temperature during a treatment was 1.8 degrees with a maximum of 2.6 degrees for the lumbar region. The axillary, oral, and rectal temperatures each rose about 0.5 degree. The heart rate increased about twenty-one beats, and the arterial pressure dropped 14 mm., the drop beginning at 80 degrees and reaching its lowest at 120 degrees. The systolic pressure was affected more than the diastolic. The higher the initial pressure the greater the drop. The cardiovascular reaction increased with age and decreased with successive treatments. It was greater in men than in women, and most marked in lumbar applications. Both the cardiovascular and the cutaneous reactions disappeared within from one half to one hour. Baking is not contraindicated in hypertension, in fact, the authors have used it with absolutely no ill effects in the cases of old persons.

The authors attempted direct estimation of the sweat secretion in lumbar treatments by measuring the increase in weight of the patient's clothing. The loss of body weight as determined by this method was from 50 to 70 gm. The reaction which was directly proportional to the body weight, increased with successive treatments and with age. It reached its maximum between the ages of forty-five and fifty years. It was minimal in micro-splanchnic longitudinal types of persons and maximal in megalosplanchnic brachymorphic types.

The finer thermic effects on bones and joints are not yet understood. In the authors' cases the external articular temperature rose from 2 to 4.7 degrees during a Bier treatment. In several cases of effusion into the knee joint the average rise in the intra-articular temperature measured with the Zondek thermometer after baking was 3.3 degrees. These observations, as well as those on the intra-abdominal temperature, show the depth and intensity of the reaction to the Bier treatment and disprove the assertion that the temperature of internal tissues can be raised only by diathermy. The authors believe that heat favors decalcification rather than recalcification and new formation of bone.

The arthropathies of arteriosclerosis and the trophic arthropathies respond especially well to thermotherapy. The bactericidal and phagocytic action of heat constitutes an elective indication for its use in gonococcal arthritis.

The article is supplemented by tables, graphs, diagrams, and an extensive bibliography.

M. E. MORSE, M.D.

FRACTURES AND DISLOCATIONS

Conwell, H. E., and Alldredge, R. H. Dislocations of the Knee Joint. *J. Am. M. Ass.*, 1936, 106: 1252.

The knee is more frequently traumatized than any other joint. Subluxations of the knee are common,

but complete dislocations are rare. In 9,000 cases of fractures and dislocations on an orthopedic service the authors found only 6 complete dislocations. Four were anterior and 2 was posterior. The sixth, a complete external lateral dislocation, is described with photographs and roentgenograms. It was reduced by manipulation and treated with good results by prolonged immobilization followed by the use of a walking caliper splint.

Open operation for knee joint dislocation is indicated only when a fracture or semilunar cartilage injury prevents closed reduction or there has been a rupture of the popliteal vessels with hematoma formation. No attempt need be made to repair the torn crucial ligaments. Stability of the joint is dependent mainly on the development of the muscles, especially that of the quadriceps muscle.

CULSTER C GUY, M.D.

Imbert, R. The Treatment of Compound Fractures of the Leg. 118 Cases (Le traitement des fractures ouvertes de jambe. 118 observations). *Rev. de chir.* 1930 53: 71.

The author reports a study of compound fractures of the leg exclusive of fractures of the malleoli, multiple injuries, and injuries necessitating immediate amputation. The 118 cases reviewed are divided ac-

cording to the type of treatment into the following groups:

Group 1. Thirty cases treated by simple reduction and immobilization without debridement. The average healing time was nine months and the average disability 36 per cent. Imbert feels that this method of treatment is justifiable only in puncture wounds caused by a fragment of bone compounding from within.

Group 2. Sixty-two cases treated by open reduction with thorough debridement. The average healing time was eight months and the average disability amounted to 30 per cent. The author is of the opinion that adequate removal of the injured soft parts is essential and must be done under general or spinal anesthesia. It should be considered a major surgical procedure.

Group 3. Twenty-six cases treated by open reduction with some form of internal fixation. The average healing time was fourteen months and the average disability 45 per cent. Two cases required amputation later.

Imbert believes that primary closure of the wound should be done only when there is no tension on the skin edges, internal fixation has not been used, and the patient can be kept under careful observation.

BARBARA B. STURSON, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Neumann, R. The Natural Retraction and Elasticity of the Vena Saphena Magna. Studies Regarding the Mechanical-Functional Bases of the Development of Varices (Die natürliche Rektion und die Dehnbarkeit der Vena saphena magna. Untersuchungen ueber die mechanisch funktionellen Grundlagen der Entstehung von Vancen) *Arch f path Anat*, 1935, 296 138

Attempts have been made to explain the development of varices experimentally, not only by transplantations but also by excising the veins and testing their strength and elasticity. However, the findings of studies of strips of veins do not approximate sufficiently closely the mechanical functional processes occurring in the walls of the vessels as the latter represent a combination of stretchings in various directions. Exact judgment of unopened veins has been prevented by the impossibility of determining the volume of the vein exactly. Therefore the author's studies were carried out by a new method in which the volume of the vein was determined in a simple and sure manner by means of an apparatus especially devised for the purpose.

The material consisted of the vena saphena magna from one or both sides of seventy-seven cadavers of various ages showing various diseases. Care was taken to be sure that the saphenae were not themselves diseased, especially that they were not affected by varicosis or thrombosis. The lengthening of the vessel when it was subjected to a known pressure of water and its elastic retraction on removal of the pressure were read off directly on the apparatus, and the changes in volume were recorded by an electrical kymograph. From the volume of the vessel and the pressure the diameter of the lumen of the vessel could be reckoned at any stage of the experiment. The results of the study were varied, but provided a promising working basis for explanation of the development of varices.

The retraction, following their removal from the body, of veins which are normally under tension while in the body decreases uniformly with age. The veins of persons with edema, varices, and severe cachexia exhibit greater retraction than those of persons with thrombosis and pronounced adiposity.

Under low and moderate pressure all veins show chiefly a lengthening which is always greater than their widening. Widening is greater only under high pressure. Up to the point of bursting, every vein regularly exhibits the following five phases of lengthening and widening: (1) marked lengthening, slight widening, (2) lengthening only, (3) widening only, (4) marked widening, shortening, and (5) widening, lengthening.

Veins of the first group (those of persons with edema, varices, chronic congestion, and severe cachexia) show little resistance to dilatation and pass through the five phases rapidly. The increase in their volume is slight and results chiefly from lengthening. Hardly any of it is due to widening. Veins of the second group (those of persons with thrombosis or arteriosclerosis and those of persons of the lowest and highest age groups) pass through the five phases very slowly. With strong resistance to stretching, the increase in the volume of such veins is great and is caused nearly as much by widening as by lengthening.

The reviewed experiments showed no differences in dilatability between the veins of the right and left extremities.

In general weakness of the connective tissue as well as in injury by external factors such as edema and adiposity, the perivascular connective tissue plays an important role in the development of varices. Under such conditions it is extremely lax, and in stretching tests the veins behave like the veins of the first group. Veins with firm perivascular tissue exhibit the characteristics of veins of the second group.

(ZIEGLWALLNER) JOHN W. BRENNAN, M.D.

BLOOD, TRANSFUSION

Lenggenhager, K. The Wonder of Spontaneous Hemostasis (Das Wunder der spontanen Blutstillung) *Muenchen med Wochenschr*, 1935, 2 2067

While it is believed that cessation of bleeding and blood coagulation are intimately bound together, there are cases showing a lack of correlation between the bleeding and the coagulation time. In hemophilia, a prolonged bleeding time and coagulation time are usually associated with a normal blood picture. However, there are cases of death caused by prolonged bleeding from small wounds in which the coagulation time is only slightly prolonged, such as the case reported by Schlossmann and Dahl. On the other hand, Lenggenhager observed a case of hemophilia with a coagulation time of over seventy minutes in which a small wound did not bleed abnormally long.

Another problem is presented by thrombocytopenic bleeding, which is prolonged even though the coagulation time is normal.

In cases of thrombasthenic bleeding the bleeding time is prolonged although both the blood-platelet count and the coagulation time are normal.

Icteric bleeding depends upon a disturbance of coagulation.

Tumor bleeding occurs despite a normal bleeding time and coagulation time. The cause of such bleed-

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE, POSTOPERATIVE TREATMENT

Lévy M. Postoperative Nitrogen Disassimilation
(la désassimilation azotée post opératoire) *J*
dirol méd et chir 1936 41 112

Even when a normal diet is given early most patients lose weight during the first two or three weeks following an operation. After a simple gynecological operation the loss may be as great as 7 or 8 kgm in fifteen days. This is quite out of proportion to the food restriction of the first few days, and is regained during convalescence. It is accompanied by a marked increase in the urinary excretion of urea due to nitrogen disassimilation. As the latter occurs also in numerous other conditions such as the fasting state and infectious disease it is not a phenomenon peculiar to the postoperative period. Its importance from the standpoint of surgery is due to the fact that it evidently plays some part in the development of toxic manifestations which may lead to severe symptoms and even death.

Postoperative nitrogen disassimilation is not constant. Although it is most common after prolonged mutilating operations it may occur after insignificant operations. Its degree cannot be predicted. It is of importance because it affects convalescence and is often a factor in late sequelae (those developing between the eighth and tenth days). To combat it means to hasten recovery. Its degree may be estimated approximately from the changes in urea excretion. However during the days immediately following an operation there is often a functional renal insufficiency with oliguria and decreased urea concentration which more or less diminishes the urea output giving the impression of absence of nitrogen disassimilation. A daily blood examination will show a more rapid increase in the urea output the greater the nitrogen disassimilation. Therefore it is of importance to study the urea output for several days and then reckon the daily average. Another factor to be considered is the rise in the residual blood nitrogen, which fraction contains bodies of high toxicity especially the polypeptid nitrogen.

Among the agents which may be used to combat postoperative nitrogen disassimilation are sodium chloride, insulin, and glucose. Both the quantitative and the qualitative aspects of nitrogen disassimilation must be considered. The condition is not directly connected with hypochloremia. It may be severe in the absence of marked hypochlorhydremia, and it does not necessarily produce toxic symptoms. Toxic postoperative symptoms (with hypochloremia and hyperazotemia) are associated with a very marked nitrogen disassimilation. Sodium chloride injected immediately after operation will reduce ni-

trogen disassimilation to a considerable degree but not wholly suppress it. The treatment should be started early and kept up for two or three days. The oral administration of sodium chloride may be begun the day after operation. The administration of insulin and glucose before and after operation has a similar but less marked effect.

With regard to the qualitative disturbances of nitrogen metabolism, the author states that the operative act produces an almost constant increase in the polypeptid nitrogen and residual nitrogen. Injections of sodium chloride will relieve postoperative toxic manifestations and in some cases reduce the residual nitrogen even below normal. The injection of sodium chloride in large doses early and systematically after operation will constantly diminish the residual nitrogen even when the blood urea reacts inversely. Insulin and glucose will not prevent a postoperative increase in residual nitrogen.

EDITH S. LANCHE MOORE

Koster H, and Hasman L P. Wound Disruption
Am J Surg, 1936, 31 537

The authors review 782 abdominal operations performed in a period of six years. Postoperative wound disruption occurred in 17 cases—14 those of males and 3 those of females. As the result of this complication 3 patients died. The primary surgical conditions in the cases of wound disruption were acute appendicitis, gastric ulcer, biliary tract disease and malignancy. In 14 of the 17 cases the inciting factor was a cough. In 2 other cases hiccough and an asthmatic attack were the direct causes. In 7 cases the disruption occurred prior to removal of the sutures which was done routinely on the seventh to the tenth day. In 10 cases of wound disruption there was no drainage of any sort.

The authors believe that the low incidence of wound rupture in the reviewed cases (0.22 per cent) is explained by the exclusive use of spinal anesthesia for abdominal surgery. When spinal anesthesia is employed good relaxation of the tissues is obtained, operative trauma is minimal, tissue approximation and closure can be accomplished properly and postoperative disturbances especially vomiting and coughing are diminished. Careful postoperative care such as the prevention and direct treatment of cough and distention will reduce the chance of disruption of the wound.

The authors do not consider late removal of skin and stay sutures a factor against wound disruption. They emphasize that the surgeon should always bear the possibility of this complication in mind recognizing that the main factors responsible for it are the general condition of the patient, the nature of the disease, and the postoperative course.

Early wound rupture may be recognized by careful examination of the wound. Swelling, a serosanguinous discharge, fluctuation, and boggyness of the wound on palpation, accompanied by unwarranted distention, nausea, and vomiting should make the surgeon suspect it. Often the skin layer is not separated. As a rule, the bowel or omental protrusion is found underneath the unhealthy looking skin when the suture is removed.

The authors advise against too early movement or turning of the patient in bed. They claim that the belief that pulmonary embolism may be prevented by early motion has not been substantiated. The patients should not be discharged from the hospital until their convalescence is complete.

Wound rupture can be treated either by suture or by tamponade. Suture may be either complete repair from the peritoneum through to the skin or simple closure of the peritoneum with tamponade of the open abdominal wall. The more complete the secondary closure the less the morbidity. However, the kind of repair depends upon the condition of the patient and the presence or absence of pus and a chronic cough. In the cases of debilitated patients tamponade is preferable. It is accomplished by pushing the intestines back into the abdomen by a strip of thick gauze and strapping the skin together. The method of suturing used in the cases reviewed included all of the layers of the abdominal wall. None of the patients treated by suture died and only 1 developed an incisional hernia. The sutures were left in for twelve days. The authors do not support the use of silver wire in wound closure as a prophylactic measure against wound disruption. They believe that postoperative wound disruption is best prevented by careful anatomical repair, limitation of trauma, especially trauma from retractors, to the minimum, the use of spinal anesthesia, and good postoperative care.

BENJAMIN G. P. SHAFIROFF, M.D.

I. Iedberg, N. The Problem of Progressive Gangrene of the Skin After Operations on the Abdomen and Thorax (Zur Frage der postoperativen, fortschreitenden Hautangrenen nach Eingriffen an Bauch und Thorax) *Acta chirurg. Scand.*, 1936 77 354

The author reports a fatal case of progressive gangrene of the skin following an operation for appendicitis with primary closure of the wound and reviews forty cases collected from the literature in which similar gangrene occurred on the abdomen or thorax.

The process seems to be a clinical entity characterized by protracted progressive gangrene of the cutis and subcutis and severe pain in the wound. In most cases it is a complication of an operation for a purulent process in the abdomen, generally suppurating appendicitis with drainage.

There is some evidence that it is caused by the combined action of a specific enterogenous type of streptococcus and staphylococci (Meleney).

Conservative treatment is always uncertain and in most cases hopeless. Radical excision of the margins of the wound extended into sound tissue will usually cure the condition provided it is not done too late.

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

Schuele, F. The Results of Primary Operative Treatment of Open Injuries of the Soft Parts and the Dangers of This Procedure (Ergebnisse primärer operativer Behandlung offener Weichteilverletzungen und die Gefahren dieser Versorgung) *Deutsche Zeitschr. f. Chir.*, 1935, 245 770

As the result of experience in the world war, all open accidental injuries treated at the emergency station of the Second Surgical Clinic of the University of Vienna during the past ten years were primarily excised and sutured. Friedrich's six hour limit was extended to twenty four hours, provided the wounds did not present symptoms of advanced inflammation. Electrical excision is no longer done. Local anesthesia must not be allowed to produce anemic effects, and great care must be taken to remove all foreign bodies (including silk sutures). The suture must not cause tension. Either Thiersch or Krause flaps may be used. The tendons should be sutured. All burrs must be completely removed, and in every case a splint dressing should be applied. The wound should be excised completely if possible. In the reviewed cases the splints were left on until the stitches were removed after ten, eighteen, or twenty one days, and the dressings were usually changed for the first time on their removal.

In the period from 1930 to 1934 this treatment was employed in 6,154 cases of open injury of the soft parts and such injuries with involvement of small bones and of joints. A drain was used only in cases of décollement and deep muscle injuries.

The author's first table is based on 5,972 cases of uncomplicated wounds. Of these, 5,825 had no disturbing symptoms. In 30 marginal necrosis occurred, in 47, disruption of the suture, in 15, partial skin necrosis, in 19, partial dehiscence, and in 26, suppurative in the suture line. In 92 cases, injured burrs were removed, in 1,073, the wounds were sutured without excision, and in 285, foreign bodies were present.

In the second table, which covers cases of infected wounds and extensive necroses, 133 afebrile and 49 febrile cases are summarized. Among these were 4 cases of phlegmon, 5 in which amputation was done on account of phlegmon, and 4 fatal cases.

The third table combines the data in the first and second tables. Of the total number of cases, 5,861 (95.24 per cent) presented no complications and 111 (1.8 per cent) presented complications. In 5,972 (97.04 per cent), healing occurred by primary intention and in 182 (2.96 per cent), by secondary intention. Of the cases in which healing occurred by secondary intention, 133 (2.10 per cent of the total

number) were afebrile, and 49 (0.8 per cent of the total number) were febrile. Five cases (0.08 per cent of the total number) required amputation and 4 cases (0.06 per cent of the total number) terminated in death.

The fourth table presents a comparison between the period from 1922 to 1926, in which conservative treatment was used most frequently and the period from 1930 to 1934 when primary operative treatment was given.

	Year	Total No of wounds	Wounds with amputation and death	Incidence of amputation and death (per cent)
Conservative treatment	1922	1 144	4	0.36
	1923	1 472	0	
	1924	1 399	5	0.36
	1925	1 599	3	0.31
	1926	1 954	4	0.20
Deep wounds with operative treatment	1930	1 967	1	0.05
	1931	2 062	0	
	1932	1 969	2	0.10
	1933	2 440	2	0.08
	1934	2 454	4	0.16

The average incidence of amputation and death was 0.24 per cent in the period from 1922 to 1926 and 0.08 per cent in the period from 1930 to 1934.

The results were definitely in favor of primary operative treatment with excision and suture since of the cases so treated healing occurred by primary intention in 97.04 per cent whereas it occurred by secondary intention in only 2.81 per cent and death resulted in only 0.15 per cent. During the period of conservative treatment death was 3 times as frequent. Excision without suture is to be considered in all cases of extensive injuries tears and gas gangrene of the soft parts as recommended by Denk and Walzel for the treatment of war injuries. No difference between the results in fresh wounds (those from ten minutes to one hour old) and wounds up to twenty four hours old could be determined. The dangers are due to incomplete excision by failure to remove all foreign bodies and defective splinting. The suturing of a Krause flap should not be attempted on every chopped off finger tip or other part with a considerable loss of tissue. In such injuries better results are obtained by the application of Thiersch flaps stump correction and plastic wound suture. However the Krause flap is definitely indicated when a small portion of bone is exposed as when the extensor side of the finger is cut off, especially injuries in which the joint is opened also in cases of deep cutting off of a finger pad.

(FRANZ) CLARENCE C. REED M.D.

Valentine, F. C. O. The Role of Toxin in Staphylococcal Infection. *Lancet* 1936 230 526

Investigation of the toxin elaborated by the staphylococcus indicated the presence of two compo-

nent antigens in filtrates of cultures of this organism the alpha hemolysin and the leucocidin. The filtrates of strains capable of invasion and causing boils and other penetrating lesions will usually be found to contain considerable amounts of leucocidin. On the other hand hemolysin production seems to bear no relation to the severity of the infection produced by a given strain. Because of the way in which hemolysis and destruction of leucocytes by different strains appear to vary independently there seems to be no question that these two substances are separate entities. Much of the confusion regarding the separate identity of hemolysin and leucocidin is attributable to the susceptibility of rabbit leucocytes to injury by hemolysin. Human corpuscles are apparently more resistant to such injury.

The author describes in detail methods by which staphylococcus toxins containing both factors may be prepared and the titer of component factors determined. Methods for determining the antihemolysin and antileucocidin titer of serum and a standard unit. The antihemolysin titer of patients suffering from staphylococcal infections may be greatly increased by the administration of toxoid prepared from strains rich in hemolysin, but the antileucocidin titer does not show a concomitant rise unless the original filtrate also contains a considerable amount of leucocidin. Clinical improvement may be noted in a case of severe staphylococcus infection before any rise in the antileucocidin titer of the serum can be detected. The author does not believe that all of the manifestations of staphylococcus infection should be attributed to toxins. He states that survival of organisms in the skin probably occurs independently of toxin production. However, when the organism invades the deeper tissues the importance of its capacity for toxin production is unquestionable. Dolman's observation that sufferers from chronic staphylococcal infection usually harbor staphylococcus aureus in the nares was confirmed in fourteen of eighteen cases studied. JONAS LOCKWOOD M.D.

Ramon G. Bocage, A. Richou, R. and Mercier, P. Antistaphylococcal Immunity Produced by Specific Anatoxin In Patients Suffering from Staphylococcal Infections (Sur l'immunité antistaphylococcique provoquée par l'anatoxine spécifique chez les malades atteints d'infections dues au staphylocoque). *Presse méd.* Par 1936 44 281

The authors have recently reported uniformly successful results from the treatment of staphylococcal infections with injections of a staphylococcus toxoid. In this article they discuss some of the theoretical considerations involved in such treatment.

In a series of forty five cases, chiefly cases of furunculosis estimates were made of the antitoxin titer of the patient's serum before and after the treatment which as a rule consisted of the administration of 3.5 c.c. of the toxoid divided into three weekly doses. In all of the cases it was possible to demonstrate a very appreciable rise in the antitoxin content of the serum or at least in the power of the serum to protect

the red corpuscles against lysis by the staphylococci, which was the test employed. Further changes have been made in the method of preparing the toxoid to increase its antigenic power as estimated from the described reaction.

Although the antibodies formed in response to the administration of the toxoid are, strictly speaking, antitoxic and not antibacterial, they exercise antibacterial power indirectly. The exotoxin elaborated by the staphylococcus acts locally on tissue cells and phagocytes, rendering them incapable of setting the natural protective mechanism in motion efficiently. When the toxin is neutralized by passive immunization, the amount of focal damage is reduced and early destruction of invading bacteria can be effected. Further evidence of this change in local immunity is the rapid increase in the degree of congestion and cellular activity around foci which occurs after the institution of the treatment. Toxoid therapy is not as effective in osteomyelitis as in cutaneous affections because bone lacks the natural protective mechanism against bacterial invasion which is possessed by the skin. Staphylococcus bacteremia may respond to toxoid treatment as the result of healing of the distributing focus and neutralization of toxins which prevent the organisms from gaining a foothold in the tissues.

JOHN LOCKWOOD, M D

Duvolr, Pollet, Bouley and Huguet. Fatal Collapse in Treatment with Staphylococcus Toxoid (Collapsus mortel au cours d'un traitement par l'anatoxine staphylococcique). *Bull et mém Soc méd d'hop de Par*, 1936, 52 344

The treatment of acute and chronic staphylococcus infections with staphylococcus toxoid is becoming widely recognized in France. Minor reactions, characterized particularly by local swelling and hyperemia around the point of injection, have been observed in some cases, but to date no serious consequences have been recorded. However, the authors report a case in which the administration of one dose of 0.5 c cm of toxoid intramuscularly appeared to be the direct cause of death. The patient was a woman fifty-one years of age. The death was attributed to anaphylactic shock as postmortem examination failed to reveal any other possible cause. The shock began eight hours after the injection and death occurred after forty-eight hours. Other patients treated with the same lot of toxoid suffered no reactions.

To prevent serious reactions the authors advise routine preliminary intracutaneous sensitivity tests with about 0.1 c cm of toxoid as is done in the use of horse serum.

JOHN LOCKWOOD, M D

ANESTHESIA

Dallemagne M J. Anesthesia and Acid-Base Equilibrium. *Anes & Anal*, 1936, 15 82

Working in the Institute of Experimental Therapeutics of Liège, Belgium, the author carried out a

series of experiments to determine the action of anesthesia on the blood reaction.

In the theoretical discussion in this report he reviews the work done previously by others, from that of Becker in 1894 to that of Wood in 1933. He calls attention to the variation in the results of previous investigators, some of whom reported the development of a postoperative acidosis and others of whom rejected this finding. As previous studies were carried out for only from forty-eight to seventy-two hours, Dallemagne decided to continue his investigations over a period of from five to eighteen days. His experimental animals were dogs.

After establishing the normal acid base equilibrium of each animal and anesthetizing the animal he observed the oscillations of the reaction in the arterial and venous blood until the alkaline reserve and the pH came back to their original state. He studied also the oxygen capacity and the oxyhemoglobin saturation in both of these bloods.

In this article he discusses the following subjects:

- 1 The Henderson Hasselbach formula and the method used to determine the gasometric pH.

- 2 The regulators of the acid base equilibrium—the lungs, kidneys, plasma buffers, and erythrocytes.

- 3 The acid base disequilibrium, non gaseous acidosis and alkalosis, gaseous acidosis and alkalosis, paradoxical and circulatory alkalosis.

- 4 The method employed in the experiments here with reported, which included the use of sodium evipan, luminal sodium, ether, chloroform, nitrous oxide, and avertin, and control studies of the normal acid base equilibrium, the dissociation curve of the carbon dioxide, the gasometric pH, the oxygen capacity of the blood, and the percentage saturation of the hemoglobin.

- 5 The results obtained. It was found that if an animal undergoes a series of anesthetics induced by the same product at the same dose or by different anesthetics, or if several animals are given the same dose of the same anesthetic or of different anesthetics the postanesthetic variations of the acid base equilibrium show the most complete anarchy.

- 6 The types of acid base disequilibrium after anesthesia.

- 7 The role of the lungs as regulators of the acid base equilibrium after anesthesia.

- 8 The importance of prolonged observation of animals or patients after the induction of anesthesia.

The article is summarized as follows:

- 1 The gases of the blood were gauged with an accurate technique. From the results of researches based on the Henderson Hasselbach formula it was possible to infer the value of the gasometric pH.

- 2 In the study of the effect of anesthetics on the acid base equilibrium of dogs, the blood reaction was followed until the various factors were back to their starting point. In this way the variations of the acid base equilibrium in time were determined.

- 3 The results indicated that no law governs the variations of the equilibrium after the administration of anesthetics.

4 The divergent results of previous investigators were due to failure to observe the acid base equilibrium for a sufficient period of time

5 After the anesthesia all of the previously recorded variations in the acid base equilibrium except gaseous alkalosis and acidosis were found

6 In several instances two special variations of the acid base equilibrium which were discovered in cases of anemia and cardiac decompensation by Dautrebande namely paradoxical alkalosis and circulatory acidosis were demonstrated

7 Comparisons of the acid base equilibrium of the venous blood and the arterial blood revealed all kinds of irregularities Among these were a hyperacid venous pH associated with a hyperalkaline arterial pH and vice versa and an arterial alkali reserve higher than the venous alkali reserve and vice versa

8 In comparisons of the action of anesthetics given several times to the same animal the reactions of the acid base equilibrium were found quite irregular

9 When the same anesthetic was given to different animals there was complete discordance in the results

10 When different anesthetics were given to the same animal the reaction of the acid base equilibrium showed complete anarchy

11 It was found that the lungs regulate the acid base equilibrium not only by expelling or retaining the gaseous carbon dioxide but also by participating like the other tissues in the retention of bicarbonate According to the circumstances they retain or release the alkalis

12 In the study of the gases contained in the blood after anesthesia it was found that sodium cyanide in any dose frequently causes serious anemia especially if it is given several times consecutively even at intervals of several weeks

MENAS JOANNIDES, M D

Goinard P Regional Anesthesia Induced by the Arterial Route (*L'anesthésie régionale par voie artérielle*) *Rev de chir* 1936 43 100

Since Wilmoth reported the author's first attempts at the induction of regional anesthesia by the arterial route in 1934 Goinard has continued to employ this method for surgery of the extremities in all cases in which it seemed preferable to inhalation anesthesia or to other forms of regional anesthesia. However it is not often indicated and there are several contra indications to its use. Recently Leriche and Fontaine have employed novocain injections in painful forms of obliterating arteritis. In 1908 Govanes of Madrid and Ransohoff of the United States independently conceived the idea of injecting anesthetics intra arterially. Besides the cases reported by them the author has been able to find the records of only five cases—two reported by Vigueras and d Estaban three by Oppel, one by Zapelloni and one by Arfan. Govanes limited the indications for the described type of

anesthesia to surgical interventions on the upper limbs

Goinard presents evidence that the arterial injection of anesthetics is less dangerous than their intravenous injection and gives a short review of the literature on the vasomotor effects of the intra arterial injection of novocain on the dog and its toxic effect in parts of the body other than the extremities

His own clinical observations show that the method is not harmful to the general condition. The arterial blood pressure is lowered only slightly or not at all the lesions of the involved extremity are not adversely affected and the injections may be repeated without ill effect.

Loss of sensation is almost immediate but may be preceded, especially in the hand by a disagreeable sensation of heat. The duration of the anesthesia obtained is indefinite. In one case it was one and three-quarters hours.

The techniques used by Ransohoff and Govanes are slightly different. Ransohoff injected the anesthetic into the circulating blood of the artery haring only the return circulation. He injected 2 cgm of cocaine in a per cent solution (1 ccm.) into the brachial artery. Govanes injects the anesthetic into an artery emptied of blood, substituting the anesthetic for the arterial blood in a portion of the limb which has been rendered ischemic. The limb is prepared as for segmental venous anesthesia. The advantage of this method is that only a small amount of anesthetic is needed, 10 cgm being sufficient for amputation of an arm. The disadvantage is that transcutaneous injection is impossible and the artery must therefore be exposed.

If a sufficient amount of the anesthetic is employed—from 25 to 50 cgm of novocain according to the segment to be anesthetized—the anesthesia obtained is excellent. The production of ischemia of the segment is usually advisable for when the venous circulation is arrested by a tourniquet, operation is very difficult. The venous hemorrhage is so increased that it is often necessary to twist the tourniquet sufficiently to arrest the arterial circulation also. For the closed reduction of fractures and luxations constriction of the return circulation is sufficient. In osteomyelitis sawing through of the bone may be done without causing pain as the deep planes are even better anesthetized than the superficial planes. The anesthesia persists for a long time after release of the compression—much longer than after intravenous anesthesia. A knowledge of anatomy is necessary for the use of the method as only the area supplied by the injected artery is affected. Sensibility returns so gradually that the patient is able to sleep without hypnosis the first night after the operation.

The author has learned from experience that to obtain satisfactory anesthesia relatively large doses must be injected—from 25 to 30 cgm. at the elbow for anesthesia of the forearm and hand from 30 to 40 cgm. in the popliteal fossa for anesthesia of the

leg and foot, 45 cgm into Hunter's canal, and at least 50 cgm at the root of the thigh

The method is recommended for cases of pulmonary lesions in which a general anesthetic is contra indicated and truncular anesthesia is not suitable because of the site of the lesion. Infiltration of the brachial plexus is more complicated and dangerous than arterial anesthesia.

Arterial anesthesia is suitable also in some cases in which spinal anesthesia is contra indicated, such as cases with hypotension. Osteo articular tuberculosis associated with pulmonary or visceral complications constitutes one of its chief indications, narcosis being contra indicated in this condition by the pulmonary complications, spinal anesthesia being contra indicated by the hypotension, and infiltration anesthesia being insufficient. In such cases the intra arterial injection of the anesthetic decreases the danger of amputation and resection. In cases of fracture, infiltration anesthesia is usually sufficient, but regional anesthesia by the arterial route may be used if the surgeon prefers not to puncture the infected area of an open fracture.

Gangrene in arteritis constitutes a contra indication to intra arterial anesthesia, but the method

may be used in acute inflammations, especially those associated with pulmonary lesions or grippe. Certain interventions on the deep musculo aponeurotic tissues may be well suited for arterial anesthesia when general anesthesia is contra indicated.

FDITH SCHIANCHE MOORE

SURGICAL INSTRUMENTS AND APPARATUS

Laurell, A. Disinfection of Surgical Instruments with Formaldehyde and Formalin (Über Formaldehyd und Formalindesinfektion chirurgischer Instrumente) *Acta chirurg Scand*, 1936, 77 341

Laurell says that the use of dry formaldehyde vapors for the disinfection of catheters and rubber tubes, which is still recommended in the literature, should be given up as it results in only superficial and insufficient disinfection. Satisfactory disinfection may be obtained by employing a 40 per cent solution of formalin in a Janet, Rovsing, Marion, or similar apparatus and putting the catheters into the apparatus in a moist condition.

Laurell agrees with Walbum that perfectly reliable sterilization can be obtained only by the use of a vacuum formalin oven.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Desjardins A U Radiotherapy for Acute and Chronic Inflammatory Conditions *Texas State J M* 1936 31 616

Some physicians who are familiar with the therapeutic possibilities of roentgen irradiation in the treatment of various inflammatory processes hesitate to make use of the method because they fear either the deleterious effects of excessive irradiation on the skin, sometimes observed after the treatment of tumors with maximal doses, or the systemic reaction with which such treatment is often associated. So far as inflammatory lesions are concerned such fears are largely unfounded if the treatment is administered by a radiologist who has had substantial experience in this phase of radiology. Comparatively small or moderate doses are employed.

Many forms of acute inflammation yield rapidly to a single small dose of roentgen rays. Other things being equal the more acute the lesion the smaller the dose of rays required. The results are most striking and prompt when the lesions are irradiated early during the stage of leucocytic infiltration and before suppuration has set in. At a later stage irradiation may still be useful as suppuration is hastened. A further advantage of early treatment is the usually prompt relief of pain. Sometimes however the relief may be preceded by an increase in the pain for a brief period. Occasionally it may be advisable to repeat the treatment after an interval of from six to ten days but as a rule this is unnecessary.

Among the acute inflammatory lesions in which the therapeutic value of irradiation appears to have been fairly established are furuncle, carbuncle, cellulitis and phlegmon, onychia and paronychia, abscess, acute adenitis, erysipelas and gas bacillus infection. Certain other acute inflammations such as sinusitis, mastoiditis, pelvic infection and osteomyelitis also seem to be influenced favorably but the accumulated evidence is not yet absolutely conclusive. The incidence of favorable results runs fairly consistently between 70 and 80 per cent. The fact that many patients recover promptly without operation does not mean that irradiation should supplant surgical measures. Rather the surgeon and radiologist should cooperate all the more closely because even when irradiation has had a good effect the shortening of the inflammatory process may require a more prompt if less extensive intervention.

According to A J and W A Quimby no pathological process in the body responds quicker to an X ray exposure than the non resolution following pneumonia. Other reports have tended to confirm this view. An equally favorable effect of irradiation

in a large percentage of cases of postoperative pneumonia as well as cases of pneumonia unrelated to surgical intervention has been recorded.

In erysipelas which is not a complication of diabetes or nephritis early and wide exposure of the affected region to a moderate dose of roentgen rays is followed by abatement of the fever in from twelve to thirty six hours and gradual recession of the disease. In some cases the lesion may recur after a variable period of improvement and additional treatment may be required to arrest the process. The treatment must not be confined to the visible part of the lesion but should include a wide area of apparently normal surrounding tissue. Favorable results can be obtained also by exposing the affected region to ultraviolet rays but this requires a strong erythema or blistering dose and it is often difficult to know whether the disease is receding or extending.

Acute parotitis is an uncommon but sinister complication of certain surgical operations. Rankin and Palmer (1930) have found that the disease is from fifteen to twenty times more common after surgical interventions on the colon than after all other operations. The reported mortality ranges between 33 and 60 per cent. A moderate dose of radium applied soon after the onset of the parotitis (infiltrative stage) caused the inflammatory process to subside in most cases within from twenty four to forty eight hours and prevented suppuration. The mortality was correspondingly reduced. Suppuration was only one tenth as common after irradiation with radium as after ordinary methods of treatment. These conclusions are based on twenty cases in only two of which surgical drainage was necessary. A few patients have been treated with the roentgen rays with equally encouraging results. Radium irradiation is preferable in many cases of postoperative parotitis because it can be given without disturbing the patient.

The favorable influence of radiotherapy on certain varieties of chronic inflammation has long been known. Among these may be mentioned tuberculosis, actinomycosis, trachoma and active infectious chronic arthritis. The doses of roentgen rays must be larger than the doses used in acute inflammations and must be repeated several times at suitable intervals. The treatment of such lesions with maximal (erythema tolerance or tumor dose) is bad practice. The effect of irradiation on tuberculous lesions is characteristically slow. In tuberculous adenitis the affected region must be irradiated every three or four weeks for from three to twelve months. In the absence of calcification the inflamed lymph nodes gradually recede and either disappear completely or remain as small fibrous granules. Unless abundant, caseous material may be slowly absorbed

or replaced by calcium. When suppuration occurs, the pus can often be withdrawn through a needle of large bore. In order to prevent the formation of a sinus the needle should be introduced, not through the thinnest tissue overlying the fluctuant area, but to one side, through dense tissue. Sometimes the pus cannot be evacuated thus and incision may be necessary. However, the extensive surgical procedures formerly in vogue are no longer necessary in the majority of cases. The resolution of tuberculous lesions appears to be hastened by supplementing periodical roentgen irradiation with daily exposure of the entire body to gradually increasing doses of ultraviolet rays (preferably emitted by a carbon arc lamp). Ultraviolet irradiation confined to the affected region is usually a waste of time. Much of what has been written about tuberculous adenitis applies to tuberculosis of the peritoneum. Tubercles in the cornea or iris recede more rapidly after exposure to roentgen rays than tuberculous lesions elsewhere in the body. The dose of roentgen rays should never exceed three fourths of an erythema dose. Larger doses, especially in the cases of children, might lead to epithelial degeneration in the lens and cataract.

When actinomycosis affects the face, mouth, or other relatively superficial structures, roentgen irradiation, the internal use of large doses of iodides, and occasionally, simple surgical incision of an abscess for drainage are the most effective measures, resulting in cure in a large percentage of the cases. Not infrequently, actinomycotic inflammation arises in the intestine. Exploratory maneuvers and any measure beyond the simple drainage of an abscess are strictly contra-indicated because they serve only to spread the infection. Thorough exposure of the entire abdomen (front and back) to a moderate dose of roentgen rays may be followed by substantial improvement and sometimes by complete and permanent cure. It is essential that the treatment be repeated several times at intervals of four weeks, and that it be supplemented by large doses of iodides. When the infection has extended to the respiratory tract, more than slight and temporary improvement is not likely to be obtained with any method of treatment.

Mavou (1902) recorded sixteen cases in which he treated trachoma with roentgen rays. Six of the patients were completely cured, and the others showed varying degrees of improvement. Mavou's experience has been corroborated by many others. The action of the rays is greatest in the early stages of the granular form of the disease and least in the late stages, when the granulations have been replaced by connective tissue.

In many cases of chronic infectious arthritis roentgen irradiation may relieve the pain, reduce the swelling and diminish the resulting functional disability. The percentage of cases in which favorable results are obtained is sufficient to deserve attention. The degree of improvement varies considerably in different cases. As in other chronic inflam-

mations, maximal improvement requires repeated treatment. The best results are obtained in cases in which the inflammation is active. Focal infection must be dealt with irrespective of irradiation.

The significant role of lymphocytes, polymorphonuclear cells, and eosinophiles in the defense of the organism against infection, and the sensitiveness of these cells to irradiation make it appear likely that the rays act mainly by destroying a proportion of the leucocytes infiltrating the lesions or circulating in the blood vessels which supply the affected area. Since leucocytic infiltration is such an important factor in the defense against infection, the question arises why the destruction of a large number of leucocytes infiltrating such lesions may not do more harm than good. The only answer is that no one has yet submitted any evidence of such an ill effect after small or moderate doses. If it can be assumed that the leucocytes which the organism mobilizes around the site of infection represent an effort to localize the infection and to get rid of the infectious material by phagocytosis or otherwise, it must be assumed also that the infiltrating cells contain or elaborate within themselves the protective substances which enable them to neutralize the bacterial or other toxic products giving rise to the defensive inflammation. If these assumptions are well founded, it seems not unreasonable to deduce that, by destroying the infiltrating leucocytes, irradiation causes the protective substances contained in these cells to be liberated and to be made even more readily available for defensive purposes than they were in the intact cells.

A considerable amount of evidence indicates that the relative proportion of leucocytic infiltration and connective tissue present in and around such a lesion influences the action of the rays in opposite directions. This will explain why larger doses are necessary for chronic processes and why the treatment must be repeated for some time before a cure or maximal improvement can be obtained.

Galili, L. The Roentgen and Radium Therapy of Cutaneous Cancer (*La roentgen e la radium terapia del cancro cutaneo*). *Radiol med*, 1936, 23, 65.

This article deals with twenty seven cases of cutaneous epithelioma which were successfully treated at the Radiological Institute of the Ospedale Riuniti of Calahria in the period from July, 1932, to June 1935. Each case is reported briefly with photographs of the lesion before and after treatment.

Some of the cases were treated by roentgen irradiation alone with 95 kv., 2 ma., filtration with 1 mm. of aluminum, and a skin target distance of 24 cm., a dose of 1,600 r being administered in a single session. Others were irradiated with surface radium applicators, and a very few with a combination of interstitial radium needles and surface radium applicators. The duration of the irradiation with the surface radium applicators was regulated so that from 2 to 3 mc destroyed per square centimeter were given when the epithelioma was not larger than 4

sq cm, and 2 mc destroyed per square centimeter were given when the epithelioma was larger. In the cases in which a combination of interstitial and surface radium irradiation was used the radium needles were inserted around the border of the lesion so as to give 1 mc destroyed per linear centimeter and were left *in situ* for from three to five days. The surface applicator was placed chiefly over the central part of the lesion and left in place long enough to give an additional 1 to $1\frac{1}{2}$ mc destroyed per square centimeter of surface.

Healing was obtained in 93 per cent of the cases in which no other type of treatment had been given previously and in 25 per cent of those in which the treatment was administered for recurrence.

The author concludes that irradiation therapy whether in the form of roentgen or radium irradiation is the method of choice for all skin cancers. It makes little difference whether the lesion is of the basal cell or the squamous cell type. Disappearance of the lesion results regularly if an adequate dose is administered. The only site at which a complication may arise is the ear where because of the proximity of cartilage healing may require a longer period. If an insufficient dose of irradiation is given in the beginning subsequent radioresistance of the carcinoma cells which according to the author is due to a latent secondary infection may develop and greatly retard healing. Under such conditions it appears preferable to complete the treatment by another method such as roentgen therapy if radium

irradiation was given first, radium therapy if roentgen irradiation was the primary treatment or surgical removal.

T LELCUTIA M D

RADIUM

Goodfellow, D R. Radium and Human Leucocytes. *Acta radiol* 1936, 17, 1.

Systematic hematological investigations were carried out in the cases of sixty one patients who were treated with radium for malignancy. In all except one of the cases in which very small doses were given there were leucocytic changes characteristic of the type of therapy employed.

Implantation treatment was found to cause a marked neutrophilia followed by a progressive and severe leucopenia affecting all types of leucocytes except, in certain cases, the monocytes. After surface therapy equally marked changes occurred, but developed more slowly than after implantation treatment. The lymphocytes were the cells most affected by the irradiation. The author has evolved a method by which a mathematical relationship between the loss of these cells from the circulating blood and the dosage employed in a given case may be established.

Structural changes in all types of leucocytes have commonly been seen during intensive radium therapy. Immature and in many cases embryonic cells have appeared during severe leucopenia. The author discusses the causation of these changes.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Huggins, C. B., Blockson, B. H., Jr., and Wilson, H. Thermal Changes in Local Asphyxia and Reactive Hyperemia. *Arch Surg*, 1936, 32: 528

The observations reported were made chiefly on man but also on dogs and rabbits. All heat determinations were made with a thermo electric couple. A method for determining the temperature of bone marrow is described. The thermal changes observed by this method after circulatory obstruction and release were comparable to those produced by the previous methods of studying these phenomena, provided certain limiting factors in the method were controlled. Mechanical obstruction resulted in a decrease of heat, and release was followed by hyperthermia in the limb. After release of constriction in the extremity there was a fall in the temperature of the unobstructed limb. Chemical obstruction of the circulation by intra arterial injections of epinephrin was followed by a similar decrease of heat, but hyperthermia did not occur after release. A preceding mechanical arrest of the circulation shortened the effect of an immediately subsequent intra arterial injection of epinephrin and led to hyperthermia.

In the dog and man, injections of from 0.5 to 0.75 c. cm. of a 1,000 solution of epinephrin hydrochloride into the femoral artery, produced complete vascular spasm even of the large arteries. Recovery as judged by visual observation of a hyperemic flush of the skin occurred in a centrifugal manner beginning proximally in the thigh. The thermal curves after such injections suggested complete arrest. In dogs, amputation below the knee was accompanied by very slight hemorrhage. Greater increments of heat occurred in reactive hyperemia in the bone marrow than in the muscle or the skin in the extremity and in the limb rendered anemic before occlusion than in the congested limb.

WALTER H. NADLER, M.D.

White, E. On the Possible Transmission of Hemolytic Streptococci by Dust. *Lancet* 1936 230: 947

Recent attempts of Colebrook to trace the source of puerperal infections have suggested very strongly that in the majority of cases streptococci had been conveyed to the genital tract from the nose or throat of the mother herself or of someone coming into contact with her. In a minority of cases no apparent source was found, and the question arose whether in these instances the organisms may not have reached the genital tract by the agency of air borne particles. Therefore, to determine the degree and duration of such contamination, tests were made of the dust of

rooms in which women with puerperal fever were individually isolated.

Blood agar plates were exposed in various parts of the rooms of twenty seven patients for variable periods of time at different times of the day. It was found that the dust was always contaminated with hemolytic streptococci, and that in most instances the strain isolated from the dust was identical with that infecting the patient. The dust of the rooms of patients infected with organisms other than the streptococcus yielded streptococci seldom and only in very scanty growths. It was found that streptococci could remain viable in dust for many days or weeks, but were rapidly destroyed by a 40 per cent formaldehyde spray.

In further support of the theory of air borne infection by hemolytic streptococci the author cites the case of an employee of the hospital who contracted acute pharyngitis and adenitis while making the bed and sweeping the room of a patient with puerperal sepsis. The employee at all times wore a mask. Cultures from her throat yielded organisms identical with those isolated from the cervix of the patient.

ARTHUR S. W. TOWNSEND, M.D.

Geschickter, C. F. Mesothelial Tumors. *Am J Cancer*, 1936, 26: 378

The mesoderm of the embryo separates early into two major divisions. A paraxial or somatic portion forms the sclerotome, and a coelomic or visceral portion forms the splanchnocoel and the tissue for the genito urinary organs. The splanchnocoel, the major derivative of the coelomic cavity, gives rise to the special serous cavities of the body, including the peritoneal, pericardial, and pleural cavities, which are lined by persisting coelomic epithelium—the mesothelium. A tendency of the coelomic epithelium to persist as such and of the underlying mesoderm to form vascular connective tissue rather than muscle is characteristic of the derivatives of the splanchnocoel. Tumors derived from the pleura, pericardium and peritoneum, to which the name "mesothelioma" is given show similar tendencies. Their components are epithelial and fibrous. The more malignant tumors are extremely vascular. The largest number of mesothelial tumors occur in the meninges. They are benign and are variously termed "arachnoidal fibroblastomas," "dural endotheliomas," and "meningiomas." The pleural tumors are next in frequency but more malignant. Tumors of the pericardium and peritoneum are extremely rare and similar in behavior to tumors of the pleura.

In the formation of the ovary the primitive mesoderm is carried inwardly with the down growing epithelium and from it tumors of a mesothelial character occasionally develop. Metastases are

formed extremely rarely by mesothelial tumors regardless of their location

Meningeal tumors constitute about one sixth of the newgrowths involving the cranial contents. Similar tumors may arise from the coverings of the spinal cord. The majority of meningeal tumors are encapsulated growths occurring in adult life. In the series of 106 cases observed by the author the peak of age incidence was in the decade between thirty and forty years. Intracranial pressure (evidenced by headache vomiting and impairment of vision) and epileptic seizures, usually beginning in the leg or arm are the most common signs. An interesting feature of these meningeal tumors is the variety of changes produced in the cranial bones. In the roentgenogram may be seen markings produced by increased vascularity, clearly demarcated areas of bone resorption and centers of calcification. At operation the meningeal tumor is found attached to the dura and extending inwardly pressing upon the brain substance. The treatment of meningeal tumors is surgical. Extirpation of the smaller growths is rarely followed by recurrence. The more invasive tumors either recur or are inoperable.

Tumors affecting the chest wall are of a variety of histological forms. Cartilaginous and osseous tumors arising from the ribs are the most common tumors in this region. Next in frequency are tumors of nerve sheaths. Mesotheliomas are among the rare tumors arising from the pleura which show characteristic microscopic and clinical features. Approximately one seventh of benign and malignant newgrowths affecting the chest wall originate from the pleural lining cells. Among the author's series of 136 cases there were 23 of mesothelioma of the pleura. Following its clinical recognition the neoplasm usually pursues a rapid course involving the pleura diffusely on one or both sides. Distant metastases are extremely rare although the mediastinal lymph nodes and the lungs may be affected in the terminal stages. Extension through the diaphragm with involvement of the liver and peritoneal cavity is not uncommon. The most common symptom is pain in the chest accompanied by bulging or retraction in the painful area. On palpation the mass can be felt either as a region of thickening or as a definite demarcated tumor protruding between the ribs or surrounding the bone. Cough, dyspnea and pleural effusion occur later in the disease. In the roentgenogram the characteristic finding is a dense shadow with its base at the ribs and its apex directed toward the mediastinum. The margins of the shadow are smooth and the base is usually moulded to the contour of the chest wall. At operation a localized mass may be found involving the pleura and the overlying structures of the chest wall including one or more ribs. In some cases the entire visible visceral and parietal pleura on the affected side are involved by a dense infiltrating mass. Neither surgery nor irradiation appears to cause improvement. Involvement of the pleura a fibroepithelial structure of the tumor, and rarity of dis-

tant metastases are characteristic of mesothelioma of the pleura.

Tumors microscopically similar to those occurring in the pleura are found in the pericardium and the peritoneal structures including the mesentery and omentum. Rarely, the mesodermal tissue of the ovary gives rise to tumors resembling the mesotheliomas. Such tumors occur in adults and are usually accompanied by cyst formation. They may be bilateral. The capsule of the ovary shows a characteristic thickening. JOSEPH K. SARAT, M.D.

Newton, A. Major Surgery in Patients Over Seventy Years of Age. *Med J Australia* 1935 1: 187.

Newton reports the cases of 100 patients over seventy years of age who were subjected to major operations with a mortality of only 8 per cent. The surgical procedures included operations for cholelithiasis, hypertrophy of the prostate, carcinoma of the stomach, carcinoma of the colon, carcinoma of the pancreas, peptic ulcer, acute intestinal obstruction, strangulated hernia, perforation of a duodenal ulcer, acute appendicitis, torsion of an ovarian cyst, carcinoma of the rectum and rupture of the rectum, exploratory laparotomies in which inoperable malignancy was discovered, radical removal of the breast for carcinoma, amputation of an extremity for gangrene due to thromboangiitis obliterans, division of the sensory root of the fifth cranial nerve for tic douloureux, and excision of the tongue and cervical glands for carcinoma.

Two of the deaths were attributed to delay of the operation and 4 to errors in the choice of the operative procedure or in the after treatment. In 1 fatal case the house surgeon failed for some hours to report the fact that hemorrhage had followed the removal of a gauze pack inserted into the prostatic cavity at the time of operation. The patient, a diabetic, lost considerable blood and died of uremia two days later. Newton states that the introduction of the Harris technique has decreased the fear of a repetition of the accident occurring in this case. He believes that one of the other patients who died would have survived if the Mikulicz technique had been used for sloughing of the bowel wall which occurred when the glass Paul tubes were tied in.

Newton believes that the management indicated for an aged patient who must undergo a major surgical operation does not differ materially from that appropriate for younger patients although in the cases of elderly persons because of the physiological degeneration of all of the organs the margin of safety is smaller and an error of judgment is followed by a swifter and more drastic penalty. A preoperative rest of some days in the hospital is of great value. During this time a diet rich in carbohydrates should be given and those responsible for the nursing of the patient should attempt to win his confidence and inspire him with hope. The surgeon must select the optimum time for the operation in each case and frequently must exercise great patience before deciding that that time has arrived. During the interval

before operation and throughout the patient's illness it is of the greatest importance to keep the patient in a mood of optimism, a task which, fortunately, is less difficult in surgical than in medical diseases of the aged. The means used must depend upon the psychological make up of the individual. There must never be any suggestion that advanced age increases the risk of operation.

With regard to the type of anesthesia to be employed for aged patients, opinions differ. However the majority of writers on the subject consider local anesthesia most suitable. In the cases reviewed by Newton, local anesthesia was restricted to cases in which there was an obvious indication for it, such as the radical treatment of hernia, in which it is desirable to prevent strain from postoperative vomiting, and cases of pyloric stenosis, in which there is risk of regurgitation of gastric contents into the respiratory passages. In all other cases some form of general anesthesia was used. With the possible exception of 2 deaths from bronchopneumonia after gastrectomy, none of the deaths could be attributed to the anesthetic. In the author's opinion the best anesthetic for aged patients is nitrous oxide and oxygen, but for abdominal operations which require more relaxation than these gases produce ethylene and oxygen can be safely substituted. These anesthetics must be administered by an anesthetist skilled in their use as it is essential to prevent cyanosis. In abdominal operations performed under ethylene anesthesia lack of gentleness on the part of the surgeon will prevent satisfactory relaxation. Most anesthetic troubles are due to the anesthetist or the surgeon rather than the drug employed. In the reviewed cases, ether was given by the intra-tracheal method to all patients subjected to removal of the prostate by the Harris method and proved quite satisfactory.

In the performance of the operation gentleness and care are essential. It is therefore obvious that the best results are obtained when the surgeon works on familiar ground in a well equipped hospital and is assisted by a team accustomed to his work. It is desirable also that the surgeon conduct the post-operative treatment himself.

After the operation the patient must be kept warm, saline solution should be administered by rectum, and food in fluid and semisolid form should be given as soon as possible. Special care must be exercised in the use of sedatives since the primary effects of these drugs and, because of the deficient powers of elimination in the aged, the secondary effects also are more pronounced than in younger patients. Morphine should be given, when necessary, in small doses and combined with atropine. Sedatives of the barbiturate group should be given with caution as the use of these drugs is often followed by mental confusion for a day or two which makes it difficult to secure the cooperation of the patient in the after treatment. The author has found the best soporific to be a mixture of phenacetin and aspirin given in small doses.

Postoperative pneumonia developing in the first few days after operation is due to pulmonary atelectasis. Its occurrence is not the fault of the anesthetist, but often the result of poor judgment on the part of the surgeon or unskilful postoperative nursing. Atelectasis is best prevented by avoidance of operation in the presence of bronchitis or excessive bronchial secretion when this is possible, protection of the patient from chills and draughts in the operating theater, the ward, and the passage between them, the establishment of full deep respiratory movement, particularly in the first few days after operation, skilled nursing and, if necessary, the injection of morphine to facilitate coughing by relieving the wound pain. The nurse should encourage the patient to take deep breaths and to cough up bronchial secretion, assist him in these efforts by supporting the abdominal wall with her hands, and move him from time to time into a more comfortable position.

The efforts of the patient and the nurse should be aided by the administration, during the first two days after the operation, of inhalations of carbon dioxide for five minutes every hour except when the patient is asleep, and, in some cases, the subcutaneous injection of coramine. It is preferable to give 30 per cent or even pure carbon dioxide by the tube and funnel method than the usual 10 per cent oxygen mixture, as the latter is ineffective unless it is administered under a tent, a contrivance resented by many patients. Expulsive efforts may be aided by the force of gravity by placing the patient flat in bed for a time and raising the foot of the bed on blocks.

Of the reviewed cases, postoperative pneumonia occurred in only 2. In both cases the condition was fatal, but the patients were treated under conditions precluding skilled postoperative nursing.

There were 2 cases of pulmonary infarction, 1 case of femoral thrombosis, and 1 case in which death occurred suddenly as the patient was walking out of the hospital, possibly as the result of embolism. The occurrence of thrombosis is best prevented by movement. Every patient should be instructed to move the lower limbs up and down, imitating the motions of riding a bicycle, several times a day. Bankoff has recently suggested the injection of 0.015 gm of ephedrine together with 0.43 mgm of atropine on the fifth, seventh, and ninth days after operation to prevent postoperative thrombosis.

In the reviewed cases no attempt was made to get the patients out of bed any earlier than younger patients. The author reported that as all senile patients fall rapidly while in bed he gets his aged patients up in a chair the day after the operation. In his opinion patients believe that they will recover if they are allowed to get out of bed early. According to Newton's experience, hope can be inspired by less radical measures, and there is no necessity to harass the aged by getting them out of bed before the wound has healed.

In conclusion the author urges that major surgery be not denied a patient because of advanced age.

MINAS JOANNIDES, M.D.

DUCTLESS GLANDS

Kosdoba A S Some Problems of Clinical Surgery and Experimental Endocrinopathology (Ueber einige Probleme der klinischen Chirurgie und der experimentellen Endocrinopathologie) *Arch f Klin Chir*, 1935 182: 414

In this article the great importance of the influence of the endocrine glands on the basic biological processes and particularly on metabolism (reticulo-endothelial system) and tissue regeneration is demonstrated. The author's findings with regard to the relationship between the absorbing function of the reticulo-endothelial system and the resistance of the organism of the experimental animal to infection when the hormones of certain endocrine glands were experimentally increased or decreased are summarized as follows:

1 Adrenal glands When the adrenal hormone was increased in the organism of the experimental animal the absorbing function of the reticulo-endothelial system and the resistance of the organism were diminished. When this hormone was decreased the resistance diminished still further. The function of the reticulo-endothelial system is very different in different types of animals.

2 Thyroid gland When the thyroid hormone was increased the absorbing function and the resistance were increased. When it was decreased the resistance was decreased and in most of the animals the absorbing function was also decreased simultaneously.

3 Testicles In young animals in which the testicular hormone was increased the absorbing function and resistance were increased. When the amount of this hormone was decreased the results were conflicting. In old animals resistance appeared to be diminished.

4 Ovaries When the ovarian hormone was increased the function of absorption was increased, but the resistance showed contradictory results. When this hormone was decreased the results were conflicting.

5 Pancreas When the pancreatic hormone was increased the absorption was increased while resistance showed no change. When this hormone was decreased resistance against infection in dogs with a pancreatic fistula was decreased. The absorbing function varied in the different types of animals.

6 Spleen When the splenic hormone was increased both absorption and resistance were increased. When this hormone was decreased no effect was demonstrable.

7 Liver When the common duct was ligated and when there was a fistula of the duct the resistance of the animals was lowered both when the liver hormone was increased and when it was decreased. The results with regard to absorption were conflicting.

The most interesting findings were made in a study of the healing of experimental wounds in various animals when the amount of hormones in the organism was increased and decreased. In general it

was found that a temporary increase or decrease of the hormones of certain glands and organs with an internal secretion was not without an effect on the organism, and that in the majority of cases it changed the course of the normal regenerative process. An increase of the adrenal hormone slowed up the regenerative processes by from two to forty-five days. This was observed in every component of the regenerating wound. The chief role was played by the blood vessels. In some of the cases of wound healing a decrease in the adrenal hormone produced opposite results in the regenerating wound. The thyroid gland also played an important role in wound healing. An experimental increase of this hormone shortened the course of the healing by from two to eleven days. Its effect was exerted chiefly on the connective tissue. This was even more obvious in experiments on animals with hypofunction of the thyroid gland. In the latter there was a delay of wound healing of from four to forty days which was associated with strong inhibition of the formation of granulation tissue and a weak reaction of the connective tissue elements. When the spleen was transplanted the healing was shortened by from two to nine days. On the other hand when the spleen was removed healing occurred more slowly and primary cohesion of the wound was delayed. The liver also is of great importance in the process of wound healing. When the common bile duct was ligated and also when a Pawlow fistula was formed the course of wound healing was lengthened by from seven to twenty-five days. When from 0.5 unit to 8 units of insulin were administered, the healing process was shortened by from three to twelve days and when the pancreas was partially resected or completely removed retardation of wound healing up to as much as two months was observed.

In the treatment of wounds with retarded granulation organotherapy was frequently used in cases without endocrine disturbances as well as in cases in which such disturbances were present. The hormones were introduced subcutaneously, intramuscularly, or intravenously or were applied locally like a vaccine. Very instructive results were obtained. Slowly granulating wounds of animals without endocrine disturbances healed much more rapidly following the use of organotherapy than similar wounds in control animals. In slowly granulating wounds in various animals which usually required an average of from twenty-eight to sixty-four days to heal healing was reduced to from fourteen to thirty-six days. The hormones of the thyroid gland, the pancreas and the sex glands as well as spleen extract were noted to have a special activity. The combined hormones of several endocrine glands were also injected. In some instances this treatment had a better effect than the use of the hormone of a single gland. The hormones and extracts of the spleen, thyroid gland, and sex glands stimulate the granulation and epithelialization processes. It was found also that the biochemistry of the blood and the wound secretion and in some cases the action of certain drugs were

influenced by hyperfunction or hypofunction of the glands of internal secretion. In torpidly granulating wounds with glassy, unhealthy granulations biochemical examination revealed increased alkalinity of the wound contents. When organotherapy was used the reaction changed toward acidity. In some investigations various pharmacological substances, such as adrenalin, morphine, pilocarpin, and physostigmin, were injected in therapeutic and large doses. When the hormones of certain endocrine glands were increased or decreased the effect of the drugs on different systems or tissues was usually also increased or decreased. Occasionally, however, no effect was observed. For instance, after removal of the thyroid gland in guinea pigs, rabbits, and dogs, the injection of lethal doses of adrenalin produced no symptoms of elevation of the blood pressure. Similar observations

were made in the case of a dog into which from 0.001 to 0.002 gm of pilocarpin was injected after the sex gland hormone had been increased by Woronow's method. Finally, ulcerative intestinal lesions were observed following an increase of thyroid gland hormone in the blood of the experimental animal and after the mechanical destruction of one adrenal gland.

In conclusion the author says that the great importance of the endocrine glands in the regenerative process of the organism should be stressed. In every type of disease the condition of these glands should be determined. Every cell of the living organism is in the sphere of action of the endocrine glands, most of which are powerful catalyzers of the processes taking place in the cell.

(HAUMANN) HARRY A. SALZMANN, M.D.

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INTERNATIONAL ABSTRACT OF SURGERY

MARCH, 1936

ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Munro, D. The Treatment of Compound Fracture of the Skull. *New England J Med* 1935, 213 551

The author compares the results in ninety six cases of compound fracture of the skull treated on a general surgical service in a period of thirteen years and eighty nine similar cases treated on a neurosurgical service. The method of treatment on the neurosurgical service is described in detail. On the patient's admission the blood pressure is recorded the surgeon's finger, covered with a sterile glove, is inserted into the scalp wound, and the diagnosis of compound fracture made by palpation only. A dry sterile dressing is then applied and appropriate treatment for surgical shock is given if such shock is present. The patient is then sent to the ward for a period of twenty four hours without further local treatment. The therapy in the ward consists of treatment of shock, the intravenous administration of hypertonic glucose, or lumbar puncture for the associated brain disturbance. At the end of twenty four hours, if the patient is in good condition, operation may be done. The operation should be performed within forty-eight hours or else postponed for from three to six months.

The method of operation is described in detail with emphasis on completeness of debridement and the requirements of closure of the wound. In the ninety six cases treated on the general surgical service the gross mortality was 54.1 per cent and the net mortality 27.8 per cent. In the eighty nine similar cases treated on the neurosurgical service the gross mortality was 23.5 per cent and the net mortality 5.5 per cent.

The author concludes that the maximum gross mortality in cases of compound fracture of the skull should not exceed 25 per cent. If the cases of patients dying untreated during the first twenty four hours after their admission to the hospital are eliminated, the mortality should not be over 10 per

cent and the maximum morbidity from sepsis should not exceed 5 per cent. ROBERT ZOLLINGER, M.D.

Ameriso J. Thrombophlebitis of the Cavernous Sinus from Tonsillitis (Tromboflebitis del seno cavernoso por amigdalitis). *Rev med d Rosario*, 1935 25 499

Thrombophlebitis of the cavernous sinus originating from the tonsils is very rare. In five of the thirteen cases which the author was able to find in the literature the condition followed tonsillectomy, in four, tonsillar or peritonsillar abscesses, and in four, tonsillitis.

Ameriso presents a detailed description of the anatomy of the cavernous sinus with colored plates showing all of the anatomical relationships. He then reports a case of thrombophlebitis of the cavernous sinus following tonsillitis.

His patient was a boy of nineteen years who developed tonsillitis with an intense general reaction, prostration, a high fever, and profuse sweating. When the patient was first seen by Ameriso, about a week after the beginning of the illness, he was unconscious, delirious, intensely agitated, and sweating profusely. His temperature was 40.2 degrees C and his pulse 180. The left tonsil was greatly enlarged and inflamed. Septic pneumonia developed and the patient died.

Autopsy disclosed pleurisy and septic bronchopneumonia, dilatation of the right heart, cloudy swelling of the liver, acute splenitis, meteorism, tonsillitis, thrombosis of the cavernous sinus, septic meningitis and a septic infarct of the hypophysis. The histological findings are described in detail and shown with photomicrographs.

AUDREY GOSH MORGAN M.D.

Klapp R. and Baumann, J. Treatment of Furuncles of the Face (Ueber die Behandlung der Gesichtsfurunkel). *Therap d Gegenw*, 1936 76 241

The peculiarity of furuncles of the face as contrasted with furuncles occurring in other parts of the

body is due chiefly to the anatomical relationships of the soft parts of the face which seem to favor the penetration of infectious material from furuncles into the deeper and surrounding layers. In addition, the close relationship of the facial veins to the veins within the skull and the internal jugular vein plays an important role. Moreover the condition is usually not a true furuncle but a carbuncle situated in an infiltration zone.

The exciting cause of facial furuncles is the yellow staphylococcus. The theory that facial furuncles are especially virulent is to be accepted with reservations. In most cases the condition runs an uncomplicated course and the treatment must be carried out with this fact in mind. Disturbance of the focus of inflammation must be avoided. Protection against mechanical irritations (pressing, scratching) absolute quiet by bed rest, and the interdiction of visitors and conversation are the chief requisites.

In mild cases the application of boracic vaseline without tight pressing or scratching bandages is usually sufficient to relax the inflamed skin and by thoroughly softening it to facilitate evacuation of the pus. In cases of medium severity it is necessary to resort to Bier's hyperemia of the neck continued for from twenty to twenty-two hours and repeated after an interval of from two to four hours. For such cases and mild cases the authors reject operative treatment as well as the injections of blood which Laeven always combines with incision. For the virulent cases with coma delirium a high temperature and chills there is no agreement regarding treatment. According to Roedelius a rise in the temperature above 38.5 degrees C. with serious local manifestations is a criterion of severity of the condition and marked local changes and a temperature under 38.5 degrees C. are characteristic of transitional cases. Bier and others have treated even the most serious cases successfully by cervical hyperemia and have thereby obtained good cosmetic results.

The choice of method for incision and evacuation of the inflammatory infectious secretions depends as much on the character and temperament of the surgeon as on the time of operation. It is of importance to bear in mind that the decompression effect of an incision does not extend farther than 3 mm. on each side. At any rate one should proceed radically enough to render repeated incisions unnecessary. In the most serious cases no consideration can be given to the cosmetic effect. The value of vein ligation to prevent pyemia in thrombophlebitis is doubtful. However, in severe cases with recurrent chills it seems justifiable to attempt to reduce such pyemic relapses by ligation of the internal jugular vein. (MASKE) CLARENCE C. REED M.D.

LI P. L. and CHI SHIH YANG. An Inquiry into the Origin of the Mixed Tumors of the Salivary Glands with Reference to Their Embryonic Interrelationships. *Am J Cancer* 1935 25 259.

The authors' study was based on twenty-five mixed tumors occurring in various locations in the

head other than the salivary glands. Eighteen were located on the face and scalp and seven in the oral cavity. All of them were removed from Chinese patients.

Mixed tumors of the salivary glands are probably embryonic tumors of local origin. From histological, regional and histogenetic points of view they seem to fall into two groups—the intra-oral and the extra-oral. To the first group belong tumors arising from oral ectoderm within the oral cavity, including tumors of the palate, gum, tongue and salivary glands. The embryonic rests from which these neoplasms are derived are formed, along with the salivary and oral glands, from invagination of the oral ectoderm as assumed by Wilms. To the second group belong (1) tumors resulting from ectodermal inclusions caused by the fusion of branchial clefts and various fissures of the head and neck, (2) tumors of the nasal cavity and its accessory sinuses arising from rests formed along with the normal mucous glands of these regions, (3) tumors of the orbit derived from rests formed from the conjunctiva together with the anlagen of the lachrymal glands and (4) various other mixed tumors of the lip, face, eyebrow and scalp assumed to have arisen from rests derived from the integument along with the anlagen of the hair follicles.

The histological similarities and differences of the mixed tumors and tumors closely allied to them are explained by differences in the origin and time of their rest formation. The location and frequency of occurrence are explained on the same grounds. In the formation of embryonic rests the influence of the time factor upon the expected potentiality of such rests is specially emphasized.

JOSEPH K. NARAT M.D.

EYE

Möller J. Orbital Phlegmons. *Ueber Orbitalphlegmonen*. Festschr. Audo 1934 p 85.

In a period of two years the author had the opportunity to treat six patients for orbital phlegmon, a disease which if not extremely rare is nevertheless uncommon. He reports the cases of these patients briefly. All were severe cases. Three of the patients died of intracranial complications. The condition is always to be traced back to some condition of the accessory cavities and is accompanied by the most varied phenomena. Among the latter are subperiosteal abscess formation in the orbit, diffuse phlegmons, optic neuritis, meningitis, and brain abscess. One of the author's cases perhaps came for treatment by the specialist too late since on account of the predominant cerebral manifestations the condition was first diagnosed as encephalitis. The correct diagnosis was not made until the patient entered the clinic.

The Birch-Hirschfeld statistics regarding the development of orbital phlegmons appear to be out of date. According to other reports (Meyding, 1920) 71 per cent of such phlegmons are of rhinogenic

origin Marx reported that of 274 patients given hospital treatment for disease of the nasal sinuses, 3 per cent had orbital complications. If the large number of patients given ambulatory treatment are included, the incidence of orbital complications in disease of the nasal sinuses falls from 0.3 to 0.4 per cent. In five of the author's cases the orbital phlegmon was due to disease of the ethmoid cells, and in one case to disease of the frontal sinus. The inflammation reaches the orbit most frequently as the result of osteitic changes with granulations, and next most frequently as the result of thrombosis and phlebitis of the vessels leading to the orbit.

The striking signs of a beginning orbital phlegmon are well known: edema of the eyelids, protrusion of the eyeball, chemosis, and a central scotoma. The nasal symptoms are less conspicuous and the findings of rhinoscopy are sometimes insignificant. However, following the use of adrenalin, pus is usually seen draining from the middle nasal duct. The roentgenogram is not always of aid as previous disease of the accessory cavities often leaves such permanent clouding that roentgen diagnosis may be very difficult.

In the differential diagnosis phlegmon of the lachrymal sac should be considered first and erysipelas and simple abscess of the eyelid next. As a rule the eye specialist is consulted first. However, as soon as there is any uncertainty as to the nature of the condition the rhinologist should be consulted as soon as possible so that he may treat the causal ailment of the accessory cavity.

The author states that orbital phlegmons are quite rare in adults, whereas they are more frequent in children (scarlet fever). In spite of their alarming appearance, the manifestations usually disappear quickly under conservative treatment with hot poultices and nasal flushings. In scarlet fever infection operation is usually injurious though there are exceptions, even in the cases of small children. In chronic diseases of the nasal sinuses operation is nearly always necessary. The operative technique is known to the specialist from the literature.

Abscess in the contents of the orbit is extremely rare. In this condition great care is necessary in the exploratory examination because of the danger of secondary infection of the retrobulbar tissue. The prognosis is always very grave.

Of the author's six patients, three died—all of meningitis. One had also an epidural abscess and a frontal lobe abscess. Even when healing occurs, sequelae such as diplopia, weakness of vision, and even blindness often result.

(GERLACH) CLARENCE C. KEEB, M.D.

Callender G. R. and Wilder, H. C. Melanoma of the Choroid. The Prognostic Significance of Argrophil Fibers. *Am. J. Cancer*, 1935, 25, 251.

In a previous report it was shown that the more malignant tumors are of the epithelioid fascicular, and mixed cell types, and that the spindle cell Sub types A and B are comparatively benign.

Wilder's modification of Foot's stain is now used to demonstrate the finer fibrils in melanomas of the choroid, regardless of age or fixation of tissues. In 205 cases an apparent relationship between the fiber content and the prognosis was apparent. Fiber distribution varied to a marked degree in different tumors and in different areas in the same tumor. The diffusely cellular tumors with no fiber formation were rare. The tumors were grouped according to their fiber content as follows:

Group 1. Those having no fibers or fibers only in the interlobular stroma.

Group 2. Those having areas with and areas without fibers.

Group 3. Those having fibers among the tumor cells throughout all areas.

Group 2 was subdivided into (1) tumors having a definite preponderance of fiberless areas, (2) tumors in which the areas with and the areas without fibers were approximately equal in number, and (3) tumors with a definite preponderance of areas containing fibers.

Of the 205 cases, all which had not been followed for at least one year were discarded. The remaining 120 cases form the basis of this report. When all areas of the primary tumor contained argrophil fibers no metastases occurred. Metastases occurred in 36 per cent of the cases in which some areas of the primary tumor contained no fibers and in 57 per cent of those cases having fibers only in the stroma of the primary tumor. In the mixed group, those having some areas without fibers, 68 per cent of the patients died. In the group in which fibers were entirely absent except in the interlobular stroma, all the patients died. The classification of fiber content is an additional aid to the prognosis, abundant fiber production indicating a more favorable prognosis than decreased fiber production.

EDWARD S. PLATT, M.D.

Lijo Pavia J. Primary Sarcoma of the Choroid. Early Diagnosis. Enucleation of an Eye with Normal Vision (Sarcoma primitivo de la coroides. Diagnostico precoz. Nucleacion del ojo con vision normal). *Rev. oto-neuro-oftalmol. y de ciruj. neurol. Sud Americana*, 1935, 10, 229.

The author calls attention to the fact that primary sarcomas of the choroid may cause no symptoms in the beginning stage. The methods of examination on which he depends for diagnosis in this stage are binocular ophthalmoscopy supplemented by ophthalmoscopy with light containing no red, examination of the visual field four times at intervals of eight days, diaphanoscopy examination, and studies of the retina by means of black and white photography and chromoretinography.

The case he reports was that of a woman twenty-seven years of age who came to the clinic for treatment for a stubborn gastralgia and had no eye symptoms at all. Vision was normal in both eyes. At the author's clinic a systematic examination is made of the eyegrounds in all cases. In the case reported

examination of the left eye with the Gullstrand Zeiss binocular ophthalmoscope showed a swelling above and outside of the macula. The swelling was diagnosed as a primary sarcoma of the choroid and the diagnosis verified by examination of the visual field. As a test treatment with neosalvarsan proved ineffective, enucleation of the eye was advised. Following removal of the eye the tumor was found to be a primary melanosarcoma of the choroid.

The operation was performed two years ago and the patient is still in excellent general health. The author regards it as probable that the tumor was extirpated near the close of its resting period, before it had extended beyond the eye.

ALDREY GOSS MORGAN M.D.

EAR

Gray, A. A. The Treatment of Otosclerosis and Similar Types of Deafness by the Local Application of Thyroxin. *J Laryngol & Otol* 1935 50 729

The author states that in a large proportion of early cases of otosclerosis and so called dry middle ear catarrh hearing can be improved and tinnitus relieved by the intratympanic injection of thyroxin. Cases in which the disease is in its latest stages do not respond. The presence of paracusis willisii is not a contra indication. The treatment is simple and can be carried out without difficulty by any otologist. It is practically or entirely painless and does not interfere with the patient's activities.

The rationale of the treatment is based upon Gray's theory that otosclerosis is the result of a decrease in the blood supply to the organ of hearing due to gradual failure of the vasomotor responses. The thyroxin applied locally produces an active congestion without an inflammatory reaction which continues for a long period of time.

It is not yet possible to say how often the treatment must be repeated. Improvement when it occurs lasts in some cases for several weeks but sooner or later the effects of the treatment must be expected to pass off. JAMES C BRASWELL M.D.

Morris, J. Characteristics and Properties of Electrical Deaf Aids. *J Laryngol & Otol* 1935 50 809

The author states that in spite of the large amount of work carried out it is generally agreed that much more investigation to obtain data concerning human ears is necessary before an artificial ear with more nearly correct characteristics can be devised.

JAMES C BRASWELL M.D.

Tumarkin, A. Scientific Audiometry and Selective Amplification in the Design and Construction of Modern Deaf Aids. *J Laryngol & Otol* 1935 50 838

The author states that it is clear that the simple pathological subdivision of deafness into the conductive and the perceptive is inadequate. We must

reconsider and classify our patients in the light of their audiometric tests if we are to give them the full benefits of the advances of modern science.

JAMES C BRASWELL M.D.

MOUTH

Livingston, E. M. and Lieber, H. The Surgical Aspects of the Treatment of Carcinoma of the Tongue. *Am J Surg* 1935 30 234

The authors emphasize the importance in the control of cancer of the tongue of dealing adequately with precancerous lesions. Leukoplakia alone accounts for 35 per cent of buccal cancers and leukoplakia before the advent of cancer is curable. It is estimated that from 50 to 75 per cent of lingual malignancies could have been prevented. The technique of dealing with precancerous lesions of the tongue is presented.

In a discussion of the method and purpose of biopsy it is urged that repeated biopsies be done if the laboratory report does not agree with the clinical picture. The importance of excision biopsy, where applicable is stressed.

The value of surgery as an allied and supplementary measure to irradiation in the treatment of lingual neoplasms is emphasized and surgical procedures for dealing with tongue lesions are described in detail. LOUIS J. BAARS M.D.

PHARYNX

Martin, C. L. Carcinoma of the Upper Pharynx. *Am J Surg* 1935 30 36

This article deals only with carcinomas originating in the posterior nasopharynx and about the tonsil on the base of the tongue back of the circumvallate papillae in the pyriform sinuses and on the lateral walls of the oropharynx.

In pharyngeal cancer surgery is difficult and often mutilating and its results are not encouraging.

The pharynx is inaccessible to a high degree it is the site of delicate and concentrated function and it contains septic material to which the surrounding tissues are not immune.

The divided dose X-ray technique supplemented by interstitial radium irradiation offers a better chance for cure than surgery and frequently produces marked palliation in incurable cases.

The gold radon seeds have the following disadvantages. Their walls are only 0.3 mm thick and allow some of the more irritating rays to pass through. It is difficult to plant such small structures in regular patterns in inaccessible locations. The seeds may slip out of place in the throat and be aspirated thereby producing a lung abscess. If placed in contact with the epiglottis they may cause necrosis of the cartilage. When planted in the upper lateral pharynx they sometimes set up a neuritis causing constant headache about the ear. They are expensive. Martin therefore uses weak radium element needles which fulfill Regaud's principles.

Martin is of the opinion that extremely short wave lengths are not necessary for good results in the treatment of pharyngeal tumors. He uses 220 kv, a filter of 2.25 mm of copper and 1.0 mm of aluminum, a tube current of 20 ma, and a target skin distance of 50 cm. These factors produce X rays with an average wave length of about 0.11 angstrom units. The average dose (300r) can be administered in fifteen minutes. At times it is advantageous to use a Thoraeus filter (0.4 mm of tin and 0.25 mm of copper) which cuts the treatment time to thirteen minutes and slightly increases the depth effect. There are many other variable factors, such as the target skin distance, the size of the daily dose, the size and distribution of treated areas, and the length of the total treatment period which must be carefully thought out for each case if the best results are to be obtained. Most throat work has been done with a target skin distance of from 50 to 60 cm, but radiologists who desire the greatest possible depth effect for a given skin reaction use 80 cm. The author treats the pharynx through two areas, one on each side of the neck. The areas are treated on alternate days and the daily dose varies from 200 to 300 r measured in the beam without backscattering. Only under exceptional circumstances are the areas larger than 10 cm in diameter. In most instances the exposures are calculated from penetration charts so that doses of from 3,000 to 3,600 r are delivered to the tumor, but in some cases smaller doses have been successful. The total time of treatment is usually about three weeks.

When large masses are present in the neck and the tumor is not extremely anaplastic, it is the author's custom to insert platinum radium needles measuring 5 cm in length beneath the involved areas. These needles are placed parallel with one another at intervals of from 1 to 1.5 cm and are left in place for seven or eight days. They have a wall thickness of 0.6 mm and contain 0.6 mgm of radium element per centimeter of active length. Divided doses of deep X ray irradiation totaling about 2,000 r are given over the same region. This treatment is started while the needles are in place.

JOSEPH K. NARAY, M.D.

Mattick, W. L. The Treatment of Pharyngeal Cancer. Fractional Dose Methods of External Irradiation. *Arch Otolaryngol*, 1935, 22: 440.

To the French school under Regaud and Coutard belongs the credit of demonstrating the value of protracted treatment with fractional doses in treatment both with the gamma rays and with the roentgen rays. The most important factors involved are (1) optimal daily fractioning of the total dose, (2) the total duration or chronology of treatment in days or weeks, and (3) the production of a more intense reaction of the skin and mucous membrane, variously designated as "epidermolysis," "epidermitis," "epithelitis," and "mucositis."

The treatment of pharyngeal cancer by fractional dose methods of external irradiation as carried out

at the Buffalo Institute for the Study of Malignant Diseases may be classified into that administered with the radium pack and that administered by roentgen irradiation.

The pack method of treatment with radium is generally carried out with one or two packs. The larger pack contains 4 gm of radium element and has a filter consisting of 1 mm of platinum, 1.5 mm of steel, 0.5 mm of copper, and 1 mm of aluminum. In cases of pharyngeal tumors the portal generally used measures 10 by 10 cm and the distance from the skin is generally 10 cm. The pack delivers approximately 6 r per minute for the 6-cm distance and 4 r per minute for the 10 cm distance, as measured by the Victoreen dosimeter. The second pack, which is a combination of element and radon, has a filter of 1 mm of platinum, 1 mm of bakelite, 1 mm of copper, and 1 mm of aluminum. With this pack a smaller portal, which generally measures 5 by 5 cm, can be used at a distance of 6 cm. With the two packs it is customary to employ a single field over the side of the lesion, to attack the tumor by crossfire by two opposite fields or by the addition of a posterior field at a distance of 10 cm, and to supplement the two lateral fields, where the irradiation is generally given at a distance of 6 cm, with a portal measuring 5 by 5 cm. With the large pack at a distance of 10 cm the author customarily gives 10,000 mgm hr daily for from eight to ten days, and with the smaller, combination pack, at a distance of 6 cm, 3,000 mgm hr daily for twelve days.

In its typical form the modified Coutard technique consists of approximately ten or eleven daily treatments to a 10 by 15 cm field over the side of the lesion with three or four supplemental treatments on the opposite side of the neck, continued until epithelitis is produced. Such treatments are given at a target distance of 50 cm at 200 kv and a rate of 23 r per minute through a Thoreau filter equivalent to approximately 3 mm of copper. The daily increments are generally 340 r.

The author's experience in the treatment of approximately 500 patients with pharyngeal cancer has suggested the following conclusions:

1 The epidermolytic dose is approximately 65 per cent higher than the former therapeutic dose.

2 The cumulative effective dose of primary roentgen irradiation necessary for the production of epidermolysis computed by means of the appropriate tissue recovery coefficients is approximately 1,300 r for the 0.16 Angstrom effective wave length and 2,000 r for the 0.11 Angstrom effective wave length.

3 Whereas a high total dose of roentgen irradiation is often reported as used in daily fractional protracted techniques, such high values are misleading and devoid of significance unless the total time over which the treatments were given and the daily increment in roentgens are also specified. The important consideration, therefore, is not the highest total dosage in roentgens which can be reported but rather a high enough cumulative effective dose to the skin or tissues to cause regression of the lesion.

examination of the left eye with the Gullstrand Zeiss binocular ophthalmoscope showed a swelling above and outside of the macula. The swelling was diagnosed as a primary sarcoma of the choroid and the diagnosis verified by examination of the visual field. As a test treatment with neosalvarsan proved ineffective, enucleation of the eye was advised. Following removal of the eye the tumor was found to be a primary melanosisarcoma of the choroid.

The operation was performed two years ago and the patient is still in excellent general health. The author regards it as probable that the tumor was extirpated near the close of its resting period, before it had extended beyond the eye.

AUDREY GOSS MORGAN M D

EAR

Gray A. A. The Treatment of Otosclerotic and Similar Types of Deafness by the Local Application of Thyroxin. *J Laryngol & Otol* 1935 50 729

The author states that in a large proportion of early cases of otosclerosis and so called dry middle ear catarrh, hearing can be improved and tinnitus relieved by the intratympanic injection of thyroxin. Cases in which the disease is in its latest stages do not respond. The presence of paracusis wilsoni is not a contra indication. The treatment is simple and can be carried out without difficulty by any otologist. It is practically or entirely painless and does not interfere with the patient's activities.

The rationale of the treatment is based upon Gray's theory that otosclerosis is the result of a decrease in the blood supply to the organ of hearing due to gradual failure of the vasomotor responses. The thyroxin applied locally produces an active congestion without an inflammatory reaction which continues for a long period of time.

It is not yet possible to say how often the treatment must be repeated. Improvement when it occurs lasts in some cases for several weeks but sooner or later the effects of the treatment must be expected to pass off. JAMES C BRASWELL M D

Morris J. Characteristics and Properties of Electric Deaf Aids. *J Laryngol & Otol* 1935 50 809

The author states that in spite of the large amount of work carried out it is generally agreed that much more investigation to obtain data concerning human ears is necessary before an artificial ear with more nearly correct characteristics can be devised.

JAMES C BRASWELL M D

Tumarkin A. Scientific Audiometry and Selective Amplification in the Design and Construction of Modern Deaf Aids. *J Laryngol & Otol* 1935 50 838

The author states that it is clear that the simple pathological subdivision of deafness into the conductive and the perceptive is inadequate. We must

reconsider and classify our patients in the light of their audiometric tests if we are to give them the full benefits of the advances of modern science.

JAMES C BRASWELL M D

MOUTH

Livingston E. M. and Lteher H. The Surgical Aspects of the Treatment of Carcinoma of the Tongue. *Am J Surg* 1935 30 234

The authors emphasize the importance, in the control of cancer of the tongue of dealing adequately with precancerous lesions. Leukoplakia alone accounts for 35 per cent of buccal cancers and leukoplakia before the advent of cancer is curable. It is estimated that from 50 to 75 per cent of lingual malignancies could have been prevented. The technique of dealing with precancerous lesions of the tongue is presented.

In a discussion of the method and purpose of biopsy it is urged that repeated biopsies be done if the laboratory report does not agree with the clinical picture. The importance of excision biopsy, where applicable is stressed.

The value of surgery as an allied and supplementary measure to irradiation in the treatment of lingual neoplasms is emphasized and surgical procedures for dealing with tongue lesions are described in detail. LOUIS J BYARS M D

PHARYNX

Martin C. L. Carcinoma of the Upper Pharynx. *Am J Surg* 1935 30 36

This article deals only with carcinomas originating in the posterior nasopharynx, in and about the tonsil on the base of the tongue back of the circumvallate papillae, in the pyriform sinuses and on the lateral walls of the oropharynx.

In pharyngeal cancer, surgery is difficult and often mutilating and its results are not encouraging.

The pharynx is inaccessible to a high degree it is the site of delicate and concentrated function and it contains septic material to which the surrounding tissues are not immune.

The divided dose X ray technique supplemented by interstitial radium irradiation offers a better chance for cure than surgery and frequently produces marked palliation in incurable cases.

The gold radon seeds have the following disadvantages. Their walls are only 0.3 mm thick and allow some of the more irritating rays to pass through. It is difficult to plant such small structures in regular patterns in inaccessible locations. The seeds may slip out of place in the throat and be aspirated thereby producing a lung abscess. If placed in contact with the epiglottitis they may cause necrosis of the cartilage. When planted in the upper lateral pharynx they sometimes set up a neuritis causing constant headache about the ear. They are expensive. Martin therefore uses weak radium element needles which fulfill Regaud's principles.

Medical treatment may be tried for six months. Iodine is used, but no drug is specific. Operation is indicated in all cases in which auricular fibrillation has developed, and is definitely required when signs of congestive heart failure are present.

PAUL STARR, M.D.

Billi, A. Rare Tumors of the Thyroid Region (Sui tumori rari dell'apparato tiroideo). *Clin. chir.*, 1935, 11: 863.

The author reviews the general symptomatology of tumors of the thyroid and parathyroids and gives the commonly accepted classifications for these tumors. After discussing eighteen cases of parathyroid tumor which he collected from the literature he reports a very unusual case which he observed.

Billi's patient was a woman of fifty-three who, about thirty years ago, immediately after her first delivery, noticed a small swelling in the middle of the front of her neck. The neoplasm grew slowly and progressively, but did not cause symptoms. About a month before the patient's admission to the hospital another swelling developed on the right side of the neck above the primary tumor and rapidly grew from the size of a walnut to that of a hen's egg. This tumor caused neuralgic pain in the temporal region and attacks of dyspnea.

On examination, the tumor in the center of the neck was found to extend from one sternocleidomastoid to the other and from the jugular fossa to the hyoid. The other tumor was immediately above it, at the right angle of the jaw. The first tumor was the size of a hen's egg, nodular, painless, hard and elastic, and fixed to the underlying tissues. The second tumor was smooth, movable and slightly painful on palpation. The skin over both neoplasms was normal. There was no exophthalmos or other ocular sign of Basedow's disease. The pulse and respiration were normal, and there was no tremor of the hands. On roentgen examination the thorax and mediastinum appeared to be normal. The larynx also was normal.

At operation, performed March 17, 1932, the larger tumor was found encapsulated and was easily removed. The smaller tumor was not definitely circumscribed and had invaded the surrounding tissues. The patient was discharged April 6 and told to return for roentgen treatment. She did not return until June 13, when she was admitted in an attack of suffocation from which she died.

Autopsy disclosed a large tumor of the front and right side of the neck. Only a small part of it extended upward into the neck. The greater part extended downward into the thorax, filling the whole upper part of the latter. The growth completely surrounded the trachea and the esophagus. The upper lobes of the lungs, the arch of the aorta, and the large vessel trunks were compressed and pushed downward. All of the mediastinal glands were enlarged. There were no signs of metastasis in the lungs, but a bone metastasis was found in the upper third of the right humerus.

Histological examination of the tumor showed a varied picture. Part of the tumor had the appearance of an alveolar epithelioma and other parts that of a sarcoma. The author presents photomicrographs of the different parts of the tumor and discusses the nature of the neoplasm. He does not believe that the growth was a parathyroid tumor. The presence of colloid in the alveoli does not argue against this diagnosis, but parathyroid tumors are generally homogeneous. Because of the extreme polymorphism of the growth and the lack of glycogen in it, Billi believes the neoplasm was a thyroid tumor. From a careful study of the cells he came to the conclusion that it was a sarcomatoid epithelioma of the thyroid gland.

AUDREY GOSS MORGAN, M.D.

Dinsmore, R. S., and Crute, G., Jr. Thyroid Problems and End Results of Operations on the Thyroid Gland. *Surg. Clin. North Am.*, 1935, 15: 859.

Simple endemic and simple adenomatous goiters are discussed. In these conditions preoperative paralysis of the recurrent laryngeal nerve is very rare. In 8,000 cases its incidence was only 0.01 per cent. Of 1,053 goiters removed, malignant tumors were found in 24. Four of the latter were recurrent. Malignancy was suspected before operation in 9 cases. Hence the authors conclude that malignancy is present in 1 per cent of all patients subjected to thyroidectomy, and that, even if malignancy is not suspected, all goiters should be operated upon early. The operative mortality is 0.25 per cent. Operative procedures for malignant tumor of the thyroid are described.

In hyperthyroidism which is iodine fast, a rising pulse rate is an indication for more conservative surgery such as ligation. Eighty-five per cent of the deaths following thyroid operations have been those of patients over forty-five years of age. In severe hyperthyroidism there are 2 definite contraindications to operation—vomiting and persistent delirium. In such cases preoperative management may fail. Irradiation is then the only hope. In 10,111 consecutive operations for hyperthyroidism performed at the Cleveland Clinic the mortality was 1.29 per cent.

In 74 cases of hyperthyroidism in patients under fourteen years of age the symptoms were similar to those in older patients. In the aged, hypermetabolism is replaced by exhaustion, emotionalism by delirium, and tachycardia by cardiac fibrillation and decompensation. The risk is greater, but the chance of recovery without radical treatment is nil. Oxygen should be given in all crises.

In hyperthyroidism with regular cardiac rhythm and normal blood pressure the heart is not enlarged. Of 426 cases with auricular fibrillation, the heart returned to normal rhythm within three days after operation in 45 per cent and later in an additional 15 per cent. Under treatment with quinidine, the heart became regular in 90 per cent of the series.

without permanent damage to the tissue bed. Such a desired cumulative effective dose can be attained only by a properly selected daily increment of roentgens in accordance with the effective wave length employed.

4 Whereas heavier filtration and a low roentgen dosage per minute rate were formerly considered essential, equally good results may be achieved with roentgen rays of the customary 0.16 Angstrom effective wave length and with the usually rapid rate per minute.

5 By the adoption of these higher epidermolitic doses as routine whenever feasible, it is possible to combat previously resistant tumors of the pharynx more successfully and to obtain primary healing in a much larger group than was possible with the older method. However, it is still too early to draw definite conclusions regarding the incidence of a year cure.

JOSEPH K. NARAT, M.D.

NECK

Sénèque J. and Lelong M. Bilateral Cervical Rib Unilateral Raynaud Syndrome. Late Result of Surgical Intervention. Removal of the Rib and Subclavicular Sympathectomy. Secondary Arteriotomy of the Humeral Artery (Côte cervicale bilatérale. Syndrome de Raynaud unilatérale. Résultat éloigné d'une intervention chirurgicale: ablation de la côte et de sympathectomie sous-clavière. Artériectomie secondaire de l'artère humérale). *Bull. et mém. Soc. nat. de chir.* 1935 61: 1073.

The case reported was that of a girl sixteen years old who for over two years had suffered from a series of sensory and motor disturbances in the right arm. There were pains which were sometimes spontaneous but were always provoked by movements of the arm. Weakness had been progressive and difficulty was experienced in performing light tasks such as sewing as well as heavy (farm) work which the patient's employment demanded. Exposure to cold produced cyanosis succeeded by pallor and loss of sensitivity to tactile, thermal and pain stimuli. Examination showed normal active movements of the right upper extremity but a diminution in strength and rapid fatigue as compared with the left. The reflexes were exaggerated. During repose the cutaneous sensitivity was normal but on effort it was lost. There was a glove-like cyanosis of the hand with hyperhidrosis. The skin was thick and scaly and the muscles were slightly atrophied. The pulse was scarcely perceptible. Palpation and roentgenography disclosed bilateral cervical ribs.

At operation the subclavian artery was found to pass over the cervical rib lying in a groove. It appeared normal. Both the cervical and the first thoracic ribs were disarticulated and a penarterial sympathectomy was performed. This operation had no effect whatever upon the symptoms. A week later the humeral artery was exposed in the middle of the arm. It was extremely slender and did not pulsate. A segment 6 cm. long was excised. The immediate postoperative result was excellent, but

within two weeks the symptoms recurred. Six weeks later the left cervical rib was removed. When the patient was examined four years later a certain amount of improvement could be detected. The old symptoms were still present but were less marked. Muscular strength had improved and the arm had increased in size.

In reviewing the general subject of cervical ribs the authors state that of all cases discovered only 10 per cent are associated with symptoms. The frequency of the anomaly is impossible to determine because it is certain that the condition is frequently not recognized. When symptoms occur they are of nervous origin in 70 per cent and of vascular origin in 20 per cent of cases. Among the complications aneurism has been observed. This is extremely rare. Most common is insufficient vascularization. The case reported by the authors is typical. Rarely the ischemia leads to gangrene.

The mechanism of the vascular disturbances is variable. The artery may be linked over the cervical rib or compressed between the cervical and the first thoracic rib. Occasionally it is compressed by fibrous bands. These bands may arise from the scalene muscle. By some all of the symptoms are attributed to sympathetic irritation.

Ombredanne says that if the artery is permeable the rib should be resected and a penarterial sympathectomy performed. When the artery is obliterated a segment of the vessel should be excised and removal of the rib becomes more or less optional.

A good result may be expected in about 85 per cent of the cases. ALBERT F. DE GROAT, M.D.

Friedgood H. B. Cycle Response of the Thyroid Gland to Experimental Excitation and Depression. *Arch. Int. Med.* 1935 55: 833.

The experiments reported were carried out on 161 guinea pigs. Sixty-one of the animals received 21 saline pituitary extract, 45 this extract and sodium iodide and 5 sodium iodide alone. Fifty were untreated. The basal metabolic rates were determined.

It was found that in general the behavior of the basal metabolic rate after the simultaneous administration of iodide and extract of the anterior lobe of the pituitary gland depended for the most part on the duration and location of the period over which the transitory depressant effect of iodine impressed itself on the cycle of hyperthyroidism caused by the administration of the pituitary extract.

PAUL STARR, M.D.

Horner Lord. Thyrotoxicosis. Its Medical Aspects. *Brit. M. J.*, 1935, 2: 1931.

The author states that there is no evidence that the secretion of a pathological thyroid differs from the secretion elaborated by the normal gland. The beneficial effect of thyroidectomy upon hyperthyroidism does not prove that the thyroid is the cause of exophthalmic goiter; it may be only one element of a vicious circle. The onset of the disease is insidious. The diagnosis may be very easy or very difficult.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS, CRANIAL NERVES

Planeth, W. Brain and Spinal Cord Injuries Following Lumbar Injections (Hirn und Rückenmarksschädigungen nach Lumbalinjektionen) 1934 Muenster 1 W, Dissertation

The author reports in detail two cases of brain and spinal cord injuries and critically reviews the literature on such injuries to date

In the first case severe paralysis of the lower extremities, incontinence, and impotence followed the inadvertent intralumbal injection of 10 ccm of a 40 per cent antipyrine solution. The incontinence and impotence still persists after two years. Walking is very difficult, and considerable muscular atrophy has occurred in the lower limbs, especially the distal parts

With few exceptions which are mentioned, such as deteriorated solutions, overdosage (in neuropathic patients the usual solutions act similarly to overdosage), the addition of impure adrenalin or the assumed toxic effect of combined novocain and scopolamin, all writers on the subject consider that correct dosage, proper solution, and perfect technique (no unnecessary loss of cerebrospinal fluid and no lowering of the cervical portion of the vertebral column) are the most important factors. Nevertheless the mortality is 0.023 per cent and in from 12 to 25 per cent of the cases there is a slight tendency toward vomiting with dizziness and headache. As a rule these symptoms soon disappear completely. They persist for a longer time in only 2 per cent of cases. Even occasional paralysis of the eye muscles usually of the abducens nerve disappear completely in a few weeks or months. Very rarely a decubitus ulcer with sharp edges develops as the result of trophic disturbances. The headaches and paralyses occur most frequently in persons who are psychically unstable or in whom the central nervous system has been more or less severely injured by lues, tabes, multiple sclerosis, tumors, Basedow's disease, acute suppuration, or intoxication by alcohol or nicotine. In the cases of luetic and neuropathic persons it is best not to give lumbar injections

The author's second case was that of an obese patient with coronary sclerosis and neurasthenia from injury

In conclusion Planeth says that early symptoms are due to changes in the cord caused directly by the substance injected. Clinically, these are paralyses, paraplegias, incontinence or weakness, pareses and paresthesias. The permanent injuries are usually atrophy of the posterior roots and columns, cortical degeneration, ascending degeneration of the columns of Goll, and degeneration of the ganglion

cells of the gray matter, especially of the large polygonal anterior horn cells. The late symptoms in the region of the head, which are manifested especially by eye muscle paralysis and headaches, as well as those in the lower part of the body are probably due to slowly developing chronic meningitis (EGERT) LEO A. JUNKLE, M.D.

Violato, A. A Retained Projectile in the Occipital Lobe. The Migration of Projectiles within the Brain (*I roiettili ritenuti nel lobo occipitale. Sulla migrazione dei proiettili nella massa encefalica*) *Arch. ital. di chir.*, 1935, 40: 673

Even before the days of the roentgen ray it was well known that a projectile might remain in the brain without producing definite alterations or symptoms. Roentgen examination has made possible the exact localization of such bodies. When one considers the vulnerability of the brain and the usual fatal nature of gunshot wounds it is not surprising that the number of such observations is small. It is of interest that such observations are made more often in civil wounds than in war wounds. It is possible that revolver bullets do not cause the severe degree of cerebral concussion that results from the penetration of rifle bullets, pieces of hand grenade, and shrapnel. Previous to the world war fewer than 100 cases were reported. After reviewing these cases briefly Violato reports the following case:

The patient was a boy eleven years old who was shot in the head by a bullet from a 6.35 caliber revolver on August 10, 1933. A few hours after the accident he was brought to the hospital in coma and apparently moribund. The wound of entrance was in the left supra-orbital region. A roentgenogram showed the bullet in a region corresponding to the temporal lobe. It had therefore traversed a good deal of the brain substance. As death seemed inevitable the family took the child home.

Three months later the boy was in good general condition. He had returned to work on the farm and complained only of slight heaviness in the head which was associated especially with marked changes in the weather, and at times of a mild headache on the left side. The ocular movements, the reaction of the pupils and vision were normal. The reflexes of the upper extremities showed slight weakness, but the others were normal. Roentgen examination showed the projectile in a position entirely different from that in which it was found immediately after the injury. The bullet was located more posteriorly and inferiorly in the skull and was in contact with the squamous portion of the occipital bone. According to measurements, it had moved about 3 cm.

In August, 1934, one year after the injury, there was no change in the clinical symptoms. A roent-

genogram showed that the bullet still occupied the position in which it was found at the preceding examination but had rotated so that its broad side instead of its point was in contact with the occipital bone.

Lighten months after the accident there was no change from the condition in 1934 and removal of the projectile, then so near the surface was advised.

This case is of interest because the projectile had traversed the brain anteroposteriorly without causing a functional lesion and the bullet changed position spontaneously.

The author discusses the relationship between the theoretical path of the projectile and the portions of the brain involved. He believes that the secondary movement of the bullet depended principally on the direction of application of the force of gravity which was sufficient to pull it through the easily penetrable soft brain tissue and that the eventual fixation of the bullet on the squamous portion of the occipital bone was probably related to its inclusion by meningeal adhesions. He suggests that if this theory is correct it might be possible to influence the direction of the movements of intracranial heavy foreign bodies by maintaining the patient in certain positions.

A. LOUIS ROSE, M.D.

VORIS H. C. Kernohan, J. W. and Adson, A. W.
Tumors of the Frontal Lobe: An Anatomical and Pathological Study. *Arch. Neurol. & Psychiat.* 1935 34 603.

This study is the result of an analysis of the anatomical site of and the histopathological findings in a series of 314 tumors of the frontal lobes.

The series includes all histologically verified neoplasms of the frontal lobes encountered at the Mayo Clinic up to January 1, 1933. No metastatic lesions were included and no tumors were certified on the basis of the presence of cystic fluid alone.

Included in the study were all neoplasms that were wholly or partially situated in or pressing on the frontal lobes as they are ordinarily defined anatomically or on the corpus callosum.

The authors have subdivided the frontal lobe into areas corresponding to those given by Tilney and Riley, who based their division on the work of Campbell. These areas are: from front to back, the prefrontal frontal premotor (intermediate precentral), and motor (precentral).

In many cases of infiltrating neoplasm, although the surgeon is able to obtain a specimen for biopsy and thus verify the tumor pathologically, exploration does not reveal the entire extent of the tumor. Accordingly it is not justifiable to place the lesion in any but the broad and general anatomical divisions. However, in 153 of the cases reviewed the authors had dependable information from exploration or autopsy as to the anatomical extent of the tumor. In all cases this information was the result of gross observation by inspection and palpation, or both. The fact that the extent of the tumor in cases of infiltrating glioma has not been checked micro-

scopically is, of course, a source of error, as these tumors often infiltrate the brain beyond the areas of gross involvement. On the other hand, these same infiltrating gliomas, especially at their peripheries, may have within them nerve fibers and even ganglion cells which are still anatomically, and probably also physiologically intact, and, in part at least, they may still be carrying out their ordinary functions. Clinically, there is evidence to confirm this, as many cases of infiltrating glioma do not present symptoms commensurate with the gross or microscopic extent of the neoplasm. Therefore from the clinical standpoint, the 2 factors just mentioned may to some extent offset each other.

In 112 (36 per cent) of the cases reviewed the tumor was on the right side; in 127 (40 per cent), on the left side; and in 75 (24 per cent), bilateral.

One hundred and twenty three (39 per cent) of the tumors were confined entirely to the frontal lobes; 152 (48 per cent) originated in the frontal lobes but involved other lobes of the cerebrum, the corpus callosum or the basal ganglia; and 38 (12 per cent) while definitely involving some portion of the frontal lobe, had their origin in other portions of the brain. Two tumors confined to the corpus callosum are also included. In 1 case there were 2 separate and distinct tumors: one a gangliocytoma in the prefrontal area, the other a spongioblastoma multiforme in the frontoparietal region of the same side. This case is therefore counted twice.

The adjacent structures involved by the 152 tumors which originated in the frontal lobes were as follows: parietal lobe 68 cases; parietal and temporal lobes 13 cases; parietal lobe and basal ganglia 6 cases; parietal lobe and corpus callosum 3 cases; insula 3 cases; insula and temporal lobe 7 cases; insula and parietal lobe 2 cases; insula and basal ganglia 6 cases; corpus callosum, 5 cases; corpus callosum and basal ganglia, 13 cases; basal ganglia 7 cases; temporal lobe 16 cases; and hypothalamus 3 cases.

The origin of the 38 tumors which involved the frontal lobe was as follows: parietal lobe 9 cases; insula 2 cases; temporal lobe and insula 3 cases; corpus callosum, 15 cases; septum pellucidum 2 cases; basal ganglia 5 cases; and hypothalamus 2 cases. In this group the most frequent site of origin was the corpus callosum and the next most frequent the parietal lobe.

When anatomically verified tumors of the frontal lobes were tabulated it was found that there were no lesions involving the premotor area alone and that the 2 largest groups occurred in the frontal prefrontal areas (50 cases) and in the entire frontal and prefrontal premotor motor areas (30 cases).

Among the 153 tumors the gross anatomical extent of which was known exactly was a subgroup of 49 tumors which were confined to the frontal lobe and did not grossly invade other parts of the cerebrum. The areas involved by these 49 tumors were as follows: prefrontal 7 cases; frontal 7 cases; premotor, no cases; motor no cases; frontal prefrontal

19 cases, premotor frontal, 3 cases, premotor motor, 3 cases, prefrontal frontal premotor 6 cases, frontal-premotor-motor, 1 case, and prefrontal-frontal and premotor motor, 3 cases

Microscopic sections from each of the 314 tumors in the series were examined. The 194 gliomas in the series were classified as follows: medulloblastoma, 1, oligodendroblastoma, 19, spongioblastoma multiforme, 113, polar spongioblastoma, 5, astroblastoma, 6, ependymoma, 5, astrocytoma, 28, oligodendroglioma, 9, gangliocytoma, 5, mixed type, 1, and unclassified, 2. The remaining tumors were classified as endothelioma in 100 cases, hemangioblastoma in 6, sarcoma in 2, lymphosarcoma in 1, epidermoid cyst in 1, and chondroma in 1.

The preponderance of spongioblastoma multiforme (now called "glioblastoma multiforme" by Cushing) in the series presented was probably due in part to the fact that the authors based their criteria for classification of gliomas on the principle that the malignancy of a tumor should be estimated from the appearance of the most malignant portions of that tumor.

One tumor in the series was classified as an atypical medulloblastoma. It is of interest that 5 tumors were classified as ependymoma. One of these was very well differentiated and was a typical papilloma of the choroid plexus. The 4 others were more primitive. Three of them contained typical oligodendroblasts and numerous mitotic figures. Since the present tendency is toward simplification in the classification of gliomas, the authors have grouped all these tumors as ependymomas. One glioma they were able to classify only as a mixed tumor. Two others were unclassified because the tissue obtained at biopsy was insufficient.

Six (2 per cent) of the tumors of the series were classified as hemangioblastomas. There were 2 true sarcomas of the brain. One tumor classified as a lymphosarcoma may or may not have been primary in the brain. The case of epidermoid cyst has been previously reported by Learmonth and Kernohan, and the case of chondroma of the falx cerebri by Verbrugghen and Learmonth.

Voris H C and Adson, A W. Tumors of the Corpus Callosum. A Pathological and Clinical Study. *Arch Neurol & Psychiat*, 1935 34 965

The diagnosis of tumor of the corpus callosum has not often been made during life. Since the advent of ventriculography, it has occasionally been made with the aid of this procedure. Even at operation, these tumors, because of this situation, are not often verified.

According to the thirty eight cases reviewed by the authors, the outstanding clinical features are early signs of increased intracranial pressure associated with marked mental changes. Motor manifestations, including convulsions, unilateral or bilateral paralysis, reflex disturbances and apraxia, are often present. So called cerebellar signs are frequently seen and may at times cause confusion in

the diagnosis, but when they are associated with convulsions or with signs of pyramidal involvement they should not lead to error. Perhaps the most difficult problem is to distinguish tumors of the corpus callosum from lesions of the frontal lobe. Levy-Valensi states that the anterior part of the corpus callosum is most frequently involved by tumor. In his review he has presented the figures for the situation of the tumor in seventy four cases collected from the literature. The entire corpus callosum was involved in nineteen cases, the genu in twenty eight, the splenium in nineteen, and the body alone in eight. In none of the reports that Voris and Adson have reviewed has the involvement of adjacent structures been adequately described.

In the cases presented by the authors the genu, genu and body, or entire corpus callosum was involved and in all there was some involvement of the frontal lobes. In a few there was also involvement of the parietal lobe. In reviewing a large number of cases of supratentorial tumor in connection with this study and studies previously reported, the authors found only two cases in which the tumor was grossly confined to the corpus callosum. This factor of subcortical involvement of the frontal lobes probably accounts in part for the similarity of the findings in the two groups, but the authors are convinced that the chief difficulties in the diagnosis of these tumors will usually be in distinguishing them from frontal, and occasionally from cerebellar, lesions. It is probable that ventriculography will often be necessary to establish the diagnosis definitely and should perhaps be used more often as tumors of this particular group are not amenable to surgery except from the standpoint of palliative decompression.

Hoff, H, and Schoenbauer, L. Postoperative Cerebral Edema (Ueber das postoperative Hirnoedem). *Deutsche med Wchnschr*, 1935, 1 786

The most important cause of cerebral edema in cases of brain tumor is roentgen irradiation. Of 700 cases of brain tumor treated in the past year, roentgen irradiation was given in 110. In 95 cases no effect was apparent, in 10, the patient's condition became definitely worse, and in 3, death occurred immediately after the irradiation. Improvement resulted in only 2, and in these 2 operations became necessary after a year. In cases of papilledema in which roentgen irradiation is successful the condition is not tumor but encephalitis. Wiesen has called attention to this fact.

The region supplied by the middle cerebral artery shows the greatest tendency toward edema. After roentgen irradiation there is a change in the brain tissues which may be grouped with the serous inflammations. Of 107 surgically treated patients who received pre operative irradiation, 35 presented definite symptoms of cerebral edema after operation. When pre operative irradiation is given the results of operation are poorer and the favorable time for operation is lost. The shorter the interval between

the irradiation and the operation the less the chance of cure. For these reasons roentgen irradiation of the closed skull in cases of brain tumor is to be avoided.

The authors gave postoperative irradiation in 120 cases of brain tumor. In only 4 was there evidence of improvement, and in these the tumor was a medulloblastoma which is well known to be sensitive to irradiation. In many of the other cases the irradiation was followed by aggravation of the condition, hemorrhages, vascular injuries in the brain, edema or sudden death. In the absence of a histological diagnosis the authors avoid postoperative roentgen irradiation as its results depend upon the type of the tumor. They now disapprove also of radium treatment as further observation of cases in which the immediate results were favorable has shown that the effect was not permanent. In cases of hypophyseal tumor temporary improvement was noted, but the course of the condition was not influenced. Of 11 cases in which irradiation was given operation became necessary in 8.

As brain edema is an exudative inflammation vasoconstricting measures such as the administration of large doses of pyramidon suggested by Fuerth should be tried. In hopeless cases the authors saw improvement after the daily administration of from 3 to 5 gr. of pyramidon by mouth and by rectum. In encephalitis and poliomyelitis pyramidon has given no results even when administered in large doses, whereas in hemorrhagic arachnoiditis its effect is surprising.

(KALEG) JACOB F. KLEIN, M.D.

SYMPATHETIC NERVES

Beattie J. Central Control of the Sympathetic Nervous System. *Brit J Surg*, 1935, 23, 444.

Experimental work during the last fifteen years has shown that stimulation of the hypothalamus causes phenomena similar to those elicited by stimulation of sympathetic and parasympathetic nerves. There is evidence that three groups of efferent fibers arise from hypothalamic nuclei: one group arising in the supra-optic area and apparently innervating the posterior and intermediate lobes of the pituitary gland; a second group arising from some or all of the same nuclei and passing into the brain stem; and the third group arising from the posterior hypothalamus. The afferent fibers to these groups have not yet been determined.

It has been demonstrated that channels or vessels pass from the anterior lobe of the pituitary gland through the stalk of the infundibulum into the region of the tuber cinereum. The weight of evidence suggests that some hypothalamic cells, probably those close to the ependyma, are influenced by chemical substances elaborated in the pituitary gland.

An analysis of all experimental evidence confirms the view that the more posterior nuclei are related to the true sympathetic nervous system because on stimulation of this area the characteristic phenomena

of sympathetic excitation—cardiac acceleration, vasoconstriction, a rise in the blood pressure, adrenalin secretion and pupillo-dilatation—occur. These effects are not obtained on stimulation after section of the hypothalamus at the level of the aqueduct of Sylvius and are abolished or lessened by doses of the barbiturates or ergotamine.

Biggart's study of diabetes insipidus has revealed that minute lesions of the nuclei close to the optic chiasma, ligation of the pituitary stalk or its destruction by tumor, or lesions in the tuber cinereum itself may give rise to the disease. It is probable then that the hypothalamopituitary nerve connections are essential for the production of the anti-diuretic hormone of the pituitary gland in normal amounts. The hormone finds its way into the blood stream and produces its effect on the kidney directly.

Various workers have shown that stimulation of the anterior regions of the hypothalamus causes effects similar to those produced by stimulation of the vagus or pelvic nerve.

One of the most important complications following operative procedures in or near the third ventricle is hyperthermia. Preservation of the posterior hypothalamus, the mamillary bodies and the tuber cinereum in an otherwise decerebrated animal prevents disturbances of the temperature control. While the temperature fall may be due to increased heat loss, diminished heat production, or both factors acting together, the balance of evidence seems to indicate that it is caused by a decrease in heat production as the continuous release of small quantities of adrenalin (which release seems to be under hypothalamic control) is apparently responsible for the production of the heat necessary to maintain body temperature.

As clinical hyperthermia is probably due to an increase of the normal heat production and as the centers which may be operative are those which are very sensitive to the depressing effects of the barbiturates, it may be worth while to treat cases of hyperthermia with barbiturates even to the point of deep anesthesia for short periods.

The evidence in favor of a central controlling mechanism for the autonomic nervous system indicates that the hypothalamus must be regarded as the necessary controlling factor.

EDWARD S. PLATT, M.D.

Telford E. D. The Technique of Sympathectomy. *Brit J Surg*, 1935, 23, 448.

The author formerly favored the posterior approach to the cervicothoracic ganglion but now prefers the anterior route. He states that while the results of sympathectomy are on the whole good, relapse or partial failure is still too frequent. This is true especially of operations for denervation of the arm. The methods used today are too gross and mutilating often resulting in undesirable effects such as Horner's syndrome.

An incomplete technique is sometimes the explanation for failure, but the observations in many cases

indicate the presence of other factors. For instance, results in the legs are consistently better and more complete than results in the arms, perhaps because the lumbar operation is probably wholly preganglionic whereas cervicothoracic ganglionectomy is postganglionic for the arm. The author has altered his technique to obtain a section which is to a large extent preganglionic by dividing the white rami of the second and third thoracic nerves and crushing and dividing the cord itself below the third thoracic ganglion. No attack is made on the stellate ganglion itself. While the results cannot be appraised before two years have elapsed, the immediate result is excellent and Horner's syndrome is not produced.

The variable anatomy of the autonomic nervous system explains some of the failures, and alternate paths to the paths now recognized are possible. Regeneration has been considered another cause of failure since it is known to occur in animals, but in one of the author's cases a second operation showed no attempt at regeneration of the divided thoracic sympathetic cord. Sympathetic cell stations may occur in the peripheral circulation, having been demonstrated on the walls of cerebral arteries. The presence of "spinal parasymphathetic" fibers is also a possibility although the evidence obtained by Kure has not been confirmed by others.

After sympathectomy the limb becomes brightly injected and warm, but after four or five days in the case of the arm and from eight to ten days in the case of the leg the color and heat begin to lessen. White claims that this is the period after which the denervated limb becomes hypersensitive to adrenaline. If this is true, treatment of Raynaud's disease will be more difficult than has been believed.

The essential automatism of plain muscle may be more important than has heretofore been thought. It is possible that too much has been expected from section of the nerve supply. Late operation after the development of secondary fibrotic changes is the cause of failure in certain cases such as advanced cases of thrombo angitis obliterans, long standing megacolon, and achalasia of the esophagus.

In some conditions sympathectomy will become one of the established procedures of surgery, but it may be that in the future the field will be more restricted than at present. EDWARD S. PLATT, M.D.

Ross, J. P. The Results of Sympathectomy. An Analysis of the Cases Reported by Fellows of the Association of Surgeons. *Brit J Surg* 1935, 23: 433.

Fewer than 250 cases were reported for this analysis, and in nearly half of them the operation was performed less than a year previously. Only about a quarter of the cases have been followed up long enough for determination of the late results of the sympathectomy.

DISORDERS OF THE CIRCULATION

Sympathetic ganglionectomy for Raynaud's disease. The cases of Raynaud's disease were divided into

3 groups according to their severity. A successful result, meaning a great diminution in the severity of attacks, was obtained in all the mild cases and in a majority of the moderately severe cases accompanied by ulceration. Of 11 cases of the severe form with scleroderma, sympathectomy was a complete failure in 8. The great majority of the patients were women. Lumbar ganglionectomy produced more favorable results than cervicothoracic ganglionectomy.

Sympathetic ganglionectomy for obliterative arteritis. Cases of thrombo angitis obliterans were divided according to their symptoms into those in which intermittent claudication was the only prominent symptom, those in which pain was present at rest as well as after exercise and those complicated by gangrene of the toes. Intermittent claudication is difficult to relieve by operation. However, rest pain and early gangrene often respond well, considering that the disease tends to be progressive and that high amputation is frequently the only alternative treatment. In the cases reviewed only 3 operations were performed for involvement of the upper extremities. Cervicothoracic ganglionectomy was successful in 2, but a complete failure in the third. Of 69 patients, 66 were men.

In 1 case of syphilitic endarteritis lumbar ganglionectomy was of no value. Of 3 cases of senile arteriosclerosis, rest pain was relieved in 1. In the 2 others amputation became necessary. It was done below the knee and the stumps healed well.

Sympathetic ganglionectomy for the circulatory disorders following infantile paralysis. In 1 case operation was performed without success for ulceration of the hand following infantile paralysis. Of 26 cases of impaired circulation in the legs which were treated by lumbar ganglionectomy, a successful result was obtained in 21 and improvement in 2. As the incidence of infantile paralysis is the same in males and females, it is of interest that nearly 4 times as many girls as boys suffered from coldness and blueness of the legs as a late complication and that the circulatory disturbance was usually less severe in the males.

Lumbar ganglionectomy for erythrocytosis frigida. This condition affects the legs of young women. It is characterized by patches of mottled red and blue discoloration. In some cases there is ulceration. In all of the uncomplicated cases a successful result was obtained, but 2 of the patients with ulcers developed a recurrence. The thickening of the tissues commonly referred to as "edema" was diminished, but the limb seldom recovered its normal shape.

DISORDERS OF THE COLON

Sympathectomy for idiopathic dilatation of the colon. There were 29 cases of idiopathic dilatation of the colon in children. Seventeen of the children were boys. The sex incidence was in contrast to that of intestinal stasis in adults. A successful result was obtained in 21 of the 29 cases and definite improvement in 7. The only failure was in a case complicated by severe general debility. In this case the

patient died three months after the operation with out having at any time shown improvement

Sympathectomy for acquired intestinal stasis. There were 15 cases of acquired intestinal stasis. Thirteen of the patients were females. The indications for operation were less clearly defined than in children and the results were less satisfactory. Of the 15 operations 7 were failures. In the cases showing improvement the results were less satisfactory than in the corresponding Hirschsprung group and there was a tendency toward recurrence of severe constipation. Dilatation of the bowel was a prominent feature in the cases responding well to sympathectomy in these groups. When stasis was present with out dilatation sympathectomy was less successful. Cases with over distention of the bladder showed improvement in bladder function.

SYMPATHECTOMY FOR PAIN

Renal pain. Teraarterial neurectomy of the renal artery was followed by a successful result in 23 of 26 cases. Relief was obtained after an initial period of forty eight hours during which there was an increase of pain with diminished secretion of urine.

Causalgia. There were 6 cases in which the characteristic pain persisted in spite of repeated attempts at relief by local operations. Of 8 cases of involvement of the hand, relief was obtained in 6 and improvement in 1. In the case of failure in which the arm was amputated for persistent pain the median nerve was found adherent to the original scar. The man with leg involvement had suffered from an ulcerated hyperesthetic amputation stump for twelve years and had never been able to wear an artificial limb. Pain ceased immediately after lumbar ganglionectomy and in a few weeks the patient was able to walk with an artificial limb. The cases most suitable for sympathectomy seemed to be those in which the pain was accompanied by vasomotor phenomena, oversensitivity to temperature changes, and excessive secretion of sweat and any gross local cause of nerve irritation had been removed.

MISCELLANEOUS CONDITIONS

Chronic arthritis. Sympathetic ganglionectomy benefited 2 of 3 patients with arm involvement and 1 of 2 patients with leg involvement.

Hyperidrosis. Hyperidrosis was successfully treated in 2 patients, 1 with excessive sweating of the hands and 1 with sweating of the feet sufficient to prevent his working.

Retinitis pigmentosa. Seven cases of retinitis pigmentosa were treated by superior cervical ganglionectomy. Slight improvement occurred in 1 and the progress of the disease seemed to be arrested in another. In the 5 others no improvement resulted.

Spasmodic dysmenorrhea. Presacral neurectomy was successful in 1 case but failed in a case of congestive dysmenorrhea.

Sympathetic ganglionectomy failed to benefit 2 children suffering from spastic diplegia and 1 patient suffering from postencephalic palsy.

Histologically sections of the tissue excised were normal in most cases. Since some abnormalities were found even when there was no reason to suppose that the sympathetic system was at fault, it is probable that the changes were variations in healthy ganglionic tissue.

Recovery of function in denervated organs. It was found that limbs tended to cool in the course of a few months as the effect of the extreme vasodilation passed off. Horner's syndrome became less marked in the course of time, but never disappeared. Recovery of sweating seldom occurred and when it did there was doubt about the completeness of the sympathectomy. Recovery of vasoconstriction in the absence of sweating indicates the development of independent activity in the arterial muscular coat favoring the view that the sympathetic system is a regulator of function and not a prime mover.

Disabilities following sympathectomy. After cervical thoracic ganglionectomy disabilities were usually temporary though a few patients complained of permanent roughness of the hands interfering with delicate work. A few patients complained of weakness of the eyes and a few of stuffiness of the nose for a few weeks. Excessive sweating of the trunk was troublesome to some patients, more often when the lumbar trunk also had been excised. After presacral neurectomy and in some cases bilateral lumbar ganglionectomy, male patients became sterile though they remained potent.

TERIARTERIAL NEURECTOMY

There is no question of the practical value of periaarterial sympathectomy in the treatment of indolent ulcers and in alleviating the pain and limiting the extent of gangrene of the extremities. In both the senile and the diabetic types of gangrene the left side was more often affected.

In conclusion the author says that except when sympathectomy is performed for the relief of pain it is not correct to say that any of the operations can effect a cure. Excisions of sympathetic nerves and ganglia were devised not to extirpate diseased structures, but to rectify disorders of function in organs the activity of which is controlled by sympathetic impulses. The results here recorded are of value insofar as they indicate the particular conditions in which this object may be achieved.

EDWARD S. PLATT, M.D.

Mellere J., and Bréhant J. Resection of the Splanchnic Nerves. Physiological Basis, Indications and Results. Operative Techniques (La résection des nerfs splanchniques. Bases physiologiques. Indications et résultats. Techniques opératoires). *J. de chir.* 1935 46 727.

The author reviews what is known of the functions of the splanchnic nerves and discusses the indications for and the results of their resection on the basis of the literature. Excision and denervation of the suprarenal glands are included because they are in some degree equivalent operations.

On the basis of the theory that arterial hypertension is caused by hyperfunction or dysfunction of the suprarenal glands, suprarenalectomy was first attempted by Vaquez. Resection of the splanchnics was performed for the same purpose by Pende in 1925. It was hoped that the cutting of the splanchnics would not only suppress the secretion of adrenalin but result in relaxation of the abdominal vessels with consequent lowering of the systemic blood pressure. Ten such operations have been performed (Pieri, Donati and Craig, and Brown). The best results were obtained in cases of paroxysmal hypertension. The blood pressure was stabilized but not greatly lowered.

If one accepts the theory that Buerger's disease is a manifestation of vascular spasm dependent upon suprarenal function, it is logical to attack the spasm by suprarenalectomy or resection of the splanchnics. Durante has reported two cases in which the results were favorable.

In paocreatctomized dogs an increased sugar tolerance is known to follow section of the splanchnic nerves. The operation has therefore been tried in a number of clinical cases of diabetes mellitus. The results have been variously judged.

Denervation of the suprarenals has been performed in thirty-five cases of peptic ulcer. In 95 per cent the pylorospasm and hyperacidity were relieved. By this operation or suprarenalectomy Crile obtained a cure in 95 per cent of cases of neurocirculatory asthenia.

The techniques of resecting the splanchnics are described in detail with the aid of ten illustrations.

Two routes are possible, the posterior mediastinal and the lumbosubdiaphragmatic.

The authors come to the conclusion that the surgery of the splanchnic nerves is a "new surgery with an uncertain destiny."

ALBERT F. DE GROAT, M.D.

MISCELLANEOUS

Pollock, L. J., and Davis, L. Visceral and Referred Pain. *Arch. Neurol. & Psychiat.*, 1935, 34: 1041.

The authors studied the pain pathways from the peritoneal diaphragm to consciousness in eighty-two animals by noting the response of the animals to faradic stimulation of the diaphragm when various parts of the nervous system were severed. They conclude that pain travels from the peritoneal diaphragm over the phrenic nerve. Entering the cord by the way of the posterior roots, it descends to the level of the eighth cervical and first, second, and third thoracic segments. A connection is then made with cells in the intermediolateral column, and sympathetic efferent impulses travel over the preganglionic fibers through the anterior roots to the cervical sympathetic ganglia. From here, postganglionic fibers travel to the skin, blood vessels, meninges, and other structures where, through the mediation of some vasomotor (?) or hormonal (?) process, the sensory endings of the cerebrospinal system are stimulated and a sensory impulse travels over the ordinary cerebrospinal system, enters the spinal cord through the posterior roots, and ascends to consciousness.

DAVID J. IMPASTATO, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Kraus E J The Pathogenesis of Galactorrhea with Remarks on the Hormonal Processes in Physiological Lactation (Zur Pathogenese der Galaktorrhoe nebst Bemerkungen ueber die hormonalen Vorgaenge bei der physiologischen Lactation) *Arch f Gynaek* 1935 159 350

Preparation of the mammary gland for lactation associated with proliferative changes during pregnancy occurs most probably under the influence of ovarian hormones

The lactation hormone under the influence of which the secretion of milk in the breast of the puerperal woman occurs may be a product of the pregnancy cells which are developed from the main cells under the action of the placenta and the hormones contained therein As long as the pregnancy cells are in the developmental stage under the action of the placenta they have no influence upon the internal secretion of the mammary gland which appears only after the placenta is cast off and the growth stimulus to the pregnancy cells is thereby terminated The involution of the pregnancy cells which begins after birth may lead to the resorption of large quantities of the lactation hormone by means of which physiological stimulus the production of milk is brought about Afterward this activity is probably maintained by the act of nursing

Under pathological conditions lactation can occur from the influence of hyperpituitarism directed to ward milk secretion Under such conditions a reduced or entirely missing function of the sex glands also plays a favorable rôle Under pathological conditions the ability to produce the lactation hormone may be due not only to the chromophobic cells of the hypophysis but also as shown by the occurrence of galactorrhea in acromegals to the eosinophilic cells

The author reports two cases of galactorrhea in nulliparous women He attributes the abnormal milk secretion in these cases to a hyperpituitarism due to glandular hyperplasia of the anterior lobe of the hypophysis with an increase in the eosinophilic cells and hypertrophic growth of the principal cells not unlike the pregnancy cells in the absence of ovarian function

The author traces the hyperplasia of the anterior lobe of the hypophysis to changes in the hypophysis due to chronic pressure In one case this pressure was due to an endothelioma at the base of the brain in the region of the tuberculum sellae and in the other to a tumor of the infundibulum situated in the third ventricle

(ANSPERINO) J DANIEL WILLEMS M D

Tirelli S Gelatinous Cancer of the Breast (Sul cancro gelatinoso del mammella) *Ididion Rome* 1935 42 sez chr 615

Tirelli reports a case of gelatinous tumor of the breast after presenting a clinical and pathological review of such neoplasms As his patient refused radical operation only the tumor was removed Two years later a recurrence in the scar was excised and the operation followed by roentgen therapy Both tumors were encapsulated and no mitoses were seen in the sections As the limited excisions and the postoperative roentgen irradiation constituted an involuntary experiment in the treatment of this type of neoplasm the patient's further course will be watched with interest

The article is illustrated and is followed by a bibliography M J MORSE M D

Grauer R C and Robinson G H The Pathogenesis of Fibro Adenosarcoma of the Breast *Arch Surg* 1935 31 677

The authors studied adenofibromas of the encapsulated variety in rats and two patients

Spontaneous adenomas from the mammary glands of rats could be transplanted into succeeding generations and their changes observed Like the normal breast which undergoes changes during the menstrual cycle the adenoma was observed to change Lactation changes occurred in the tumors even when they were transplanted into a subcutaneous site distant from all breast tissue All of these changes were observed by the authors also in adenomas of the human breast

After three years of successive transplantations a pure growth of fibrous tissue was obtained in which all ducts and acini had been completely replaced by connective tissue Thus a pure fibroma was obtained from the original adenofibroma One such tumor which had been transplanted for ten generations began to grow very rapidly and caused an ulceration of the overlying skin It could be shelled out easily, was firm to the touch and had the fleshy appearance characteristic of sarcoma Microscopically it showed the morphological characteristics of fibrosarcoma However it was not invasive being definitely circumscribed

In women the authors found two tumors the microscopic sections of which were indistinguishable from those of the rat tumors

This evidence is presented to prove the occurrence of adenofibrosarcoma of the breast as a clinical and pathological entity The development of this tumor begins with a benign adenoma and progresses to a morphological sarcoma in the breast of the experimental animal and the human breast

J DANIEL WILLEMS M D

TRACHEA, LUNGS, AND PLEURA

Coryllos, P N The Surgery of Pulmonary Tuberculosis—Its Indications, Techniques, and Results *Quarterly Bull Sea View Hosp, New York* 1933, 1 89

The principal surgical methods besides pneumothorax which are used to effect collapse of tuberculous portions of the lung are intrapleural pneumolysis, closed (Jacobaes) or open, extrapleural apicolysis with packing or plombe interruption of the phrenic nerve either temporarily (crushing) or permanently (avulsion) and thoracoplasty, partial or complete Other procedures such as scalenotomy, thoracoplasty with packing (Casper), multiple intercostal neurectomy (Alexander), and pneumocavectomy (Neuhof) are of secondary importance, if any In the first rank of present day collapse methods are pneumothorax and thoracoplasty Other methods are to be used only to supplement them and never as substitutes for them The best procedure is not the least dangerous procedure but the procedure which will be most effective in the given case The treatment of pulmonary tuberculosis must be medicosurgical

In the acute forms of pulmonary tuberculosis the patient should be kept at rest in bed until the diagnosis between the benign exudative and caseous pneumonic form is made In the first condition no collapse treatment is necessary In the second, early collapse treatment should be instituted following the appearance of cavities

In the chronic productive form of pulmonary tuberculosis in which no sizable cavities are present there is no indication for surgical treatment

In the choice of cases for surgical treatment the patients should be subjected to a careful general examination and especially an examination of the genito urinary system Electrocardiograms and injections of dye for the determination of amyloid degeneration should be made Extrapulmonary tuberculosis and especially Pott's disease should be looked for Intestinal and laryngeal tuberculosis even when moderately advanced, and amyloid degeneration do not contra indicate thoracoplasty On the other hand, renal tuberculosis should be taken care of before any major thoracic operation is undertaken Advanced age (above forty five years) chronic anaemia, often indicated by a high red cell count, high hemoglobin, and deficient oxygen saturation of the arterial blood, marked emphysema and a marked decrease in vital capacity should be carefully considered as they are often more important criteria of operability than the anatomical characteristics of the pulmonary lesions However patients with only one lobe or one lung functionally good have been subjected to extensive bilateral thoracoplasty with successful results

For the majority of cases of unilateral cavities, pneumothorax is still the procedure of choice, but in cases with cavities above or at the level of the first rib, thoracoplasty is a better procedure In the

author's cases in which pneumothorax could not be induced, the best results were obtained with thoracoplasty on from three to six ribs performed in one or two stages Because of the excellent general condition of the patients there were no deaths The postoperative and later results were excellent In over 80 per cent of the cases the sputum became and remained free from tubercle bacilli The duration of the treatment ranged from four to eight weeks After six months of postoperative rest the patients resumed an active life If pneumothorax does not produce a good selective collapse in from three to four weeks it should be abandoned and thoracoplasty should be advised

In cases of apical adherent cavities with contra indications to thoracoplasty and apicolysis the procedure known as "apicolysis with plombe" finds its indications

In 95 per cent of all cases of adhesions, the adhesions are attached at the posterior chest wall These are the ones that should be cut Anterior, interlobar, and mediastinal adhesions interfere little, if any, with the closure of cavities Partially sectioned short and stout adhesions often become elongated under the action of pneumothorax so that they can be completely and safely severed in a subsequent stage

In 16 per cent of cases of suspended cavities, phrenic nerve interruption has given good results When the apical cavity is 3 cm in diameter and the lower lobe is healthy, thoracoplasty is the operation of choice

In 60 per cent of the author's cases of giant cavities all surgical attempts were resisted The treatment of such cases in which extensive thoracoplasties with or without packing have been unsuccessful constitutes a problem yet to be solved

In cases of bilateral apical cavities, pneumothorax should be tried on both sides If satisfactory collapse is produced on both sides, but the sputum remains positive, thoracoplasty should be carried out on the side with the more active lesions If good collapse by pneumothorax can be obtained on only one side, thoracoplasty should be performed on the other side When neither side can be collapsed, a bilateral staged thoracoplasty should be performed In cases in which the sputum becomes and remains negative after thoracoplasty on one side the pneumothorax should be induced on the other side as in unilateral cases When the sputum remains positive and the cavity on the pneumothorax side remains visible pneumothorax treatment should be stopped and thoracoplasty performed on that side

In cases with an apical cavity on one side and an extensive lesion on the other side it is best to perform thoracoplasty on the more affected side

In cases with extensive lesions on both sides, surgical treatment is seldom possible When the lesions do not extend beyond half of each lung, carefully staged thoracoplasties may yield surprising results In the majority of bilateral cases it has been noticed that following successful collapse on one

side, there is considerable improvement on the other side. Occasionally the lesion of the contralateral lung disappears completely. The explanation is that closure of the bronchial outlets and collapse of the cavity on one side arrests the growth of the bacilli contained in the cavity and further production of toxic products and tuberculin. Thus there is a reduction of the allergic infiltration around the lesion of the other lung and probably of the whole allergic tissue reactivity of the lung causing abatement of the destructive tuberculous process.

In pure tuberculous empyema with active or healed pulmonary lesions thoracoplasty should be done. In cases of mixed infection continuous irrigation after thoracotomy and drainage is the method of choice. The incision of thoracotomy must be placed near the anterior axillary line in order to avoid interference with the incision of the future thoracoplasty. The best treatment of mixed infection tuberculous empyema is prevention of the condition by obliteration of the pleural cavity before mixed infection complicates a pure tuberculous empyema.

CHARLES BARON, M.D.

Blasini A. Collapse Therapy of the Lung (La col-
latura terapeutica polmonare). *Arch ital di chir* 1935
40 549

Blasini studied the effect of total pneumothorax, extrapleural plombierung (Brauer method) complete extrapleural thoracoplasty and phrenic evulsion on the normal rabbit lung to determine the comparative efficiency of the procedures and the nature and evolution of the structural changes. These studies were indicated especially because experimental researches on the mechanism of fibrosis, the circulatory changes and the amount of blood in the lung in collapse therapy have been few and most of them have not been controlled roentgenologically. In the author's investigations the animals were followed clinically and roentgenologically for periods ranging up to four months and the lungs were studied both histologically and by means of angiograms made after the injection of thioraphamine.

The findings indicated that fibrosis is the primary and predominant feature in all the procedures and the change to which all other changes are allied. Pneumothorax produces a rapid and relatively uniform retraction giving the maximum collapse compatible with the elasticity of the lung tissue. The fibrosis arises first in the peribronchial and subpleural tissue. Later an enormous perivascular fibrosis occurs.

Angiograms are of great importance in demonstrating irregularities in the outlines, brusque interruptions of the vessels and a noteworthy reduction in the field of the pulmonary artery. Formerly the circulatory changes were generally believed to be primary, but in Blasini's opinion they are secondary to the fibrosis in the other tissues.

The local changes after plombierung are reflected first and predominantly in compression of the bronchial system and eventually in reduction of the

vascular caliber. The non-compressed portion of the lung shows a characteristic hyperemia accompanied by hyperplasia of the peribronchial lymph follicles. In thoracoplasty, lymphatic hyperplasia is absent. The first changes are a diffuse hyperemia and reduction of the lung in toto. Congestive "poussées" due to circulatory disturbances are frequent. The end results of phrenic evulsion are the same as those of the other procedures but are brought about more slowly. The lesions are rather mild and relatively uniform. Peribronchial fibrosis appears late and is limited to the large divisions while perivascular fibrosis predominates.

Although applying these findings to human cases with caution Blasini deduces from them that pneumothorax best fulfills all the static and dynamic conditions favoring retraction of the elastic tissue and that therefore when practicable, it is the most efficient method of collapse therapy.

The article is accompanied by numerous illustrations and an Italian, French and German bibliography.

M. E. MORSE, M.D.

Michetti D. and Roulet A. Indications and Technique for Puncture and Evacuation in Serofibrinous Pleurisy. In *Thérapeutique Pneumothorax* (Indications et technique de la ponction évacuatrice au cours des pleurésies séro-fibrineuses de pneumothorax thérapeutique). *Presse méd* 1935 43 1605

Michetti and Roulet call attention to the fact that one of the drawbacks to the use of artificial pneumothorax in the treatment of pulmonary tuberculosis is the frequency with which pleurisy develops. They believe that if the pleurisy is of the serofibrinous type, accompanied by fever and digestive disturbances, puncture for the evacuation of the exudate is indicated definitely.

In most cases the pleurisy develops early, in the first six months of pneumothorax therapy. When repeated fluoroscopic examinations show that the exudate is considerable in amount and remains at the same level puncture is indicated. If the pleurisy does not develop until later, i.e., from eighteen months to two years after the institution of the pneumothorax, evacuation of the exudate by puncture is less imperative. However it should be done if there are signs of activity of the pulmonary lesion or if other special indications arise.

The puncture should be made with the patient in dorsal decubitus and the foot of the bed or operating table slightly raised. Strict precautions for asepsis should be taken. The puncture should be made in the median axillary line at the level of the fourth intercostal space. From 300 to 600 c.c. of fluid may be removed at one time, but if the amount of exudate is large, more than one puncture is necessary in order to prevent too sudden decompression and a pleural reaction. Puncture at a high level avoids danger of puncturing the lung. The authors have never observed any infection or upward reaction following this procedure. Removal of the exudate

prevents the formation of adhesions which might interfere with the success of the pneumothorax

ALICE M MEYERS

Kulczycki, A., and Nowotny, G. Thoracoplasty and Thoracic Muscle as a Physiological Pulmonary Plug. Also a Contribution to the Knowledge of Degeneration of Muscle (Thorakoplastik und Brustmuskulatur als physiologische Lungenpfropfung. Zugleich ein Beitrag zur Kenntnis der Muskeldegeneration). *Bull. internat. de l'Académie Polonaise de sciences et de lettres*, 1935, p. 135

Studies of the physiological plug produced by a suitable thoracic muscle plastic in rabbits demonstrated that, even a few hours after the operation, the muscle begins to show regressive changes which may eventually lead to almost complete degeneration of the muscle plug. It is possible to recognize different types of degeneration such as fatty, finely granular, vacuolar degeneration, fibrillary segmentation, and particularly, waxy changes.

The characteristic feature of the entire course of the degenerative process in most cases is the small number of the nuclei in the degenerating fibers with their marked accumulation in certain places. In these accumulations, leucocytes, muscle cells, and in terstitial nuclei are very often seen. As many sections show, the accumulations may originate from the emigration or elimination of the nuclei from the fibers.

The products of degeneration are either resorbed or undergo phagocytosis. In their place there begins a marked development of the connective tissue, the appearance of which indicates the physiological and anatomical death of the plug. The findings of the microscopic investigations confirm the observations of previous investigators regarding the behavior of muscle used as a plug. However, the studies of earlier investigators were usually made on muscle transplants.

The authors conclude from their findings that the muscle plug cannot exert such an effective pressure upon the lung as was originally assumed, and that the positive results achieved with the described procedure in man are attributable to the thoracoplasty alone and not to the action of the muscle plug.

LOUIS NEUWELT, M.D.

Kline, B. S., and Berger, S. S. Pulmonary Abscess and Pulmonary Gangrene. An Analysis of Ninety Cases Observed in Ten Years. *Arch. Int. Med.*, 1935, 56: 723

In the past ten years at Mount Sinai Hospital, Cleveland (270 beds), 55 cases of pulmonary spirochetosis better designated as "Miller-Vincent infection of the lung," including 39 cases of pulmonary gangrene, have been observed as well as 12 cases of bronchogenic pulmonary abscess and 23 cases of embolic pulmonary abscesses.

The embolic pulmonary abscesses were associated with areas of suppuration elsewhere in the body and were manifestations of a generalized pyemia or bacteremia.

Of the local bronchogenic pulmonary lesions, gangrene was observed more than 3 times as frequently as abscess. Although all the cases presented clinically the picture of so called abscess of the lung, they were usually readily recognized by distinguishing characteristics as cases of gangrene and abscess, respectively. Twenty-two cases of pulmonary gangrene followed an operation, which in all but a few instances was performed under general anesthesia. Half the operations were on the oral cavity. This incidence emphasizes the danger of the aspiration of infective material from the oral cavity, especially during general anesthesia.

Ninety six per cent of the patients with embolic pulmonary abscess died. The mortality in cases of bronchogenic abscess was 58 per cent. In contrast to these results are those in the cases of properly treated patients with pulmonary gangrene with cavitation, a much more severe process than pyogenic abscess. In 25 such cases the mortality was only 32 per cent.

Although at times it is a problem clinically and anatomically to distinguish abscess, putrid abscess and early gangrene with the organisms both of suppuration and of gangrene, this difficulty does not justify the consideration of pulmonary gangrene and abscess of the lung as a single entity. Pyogenic organisms never produce gangrene, whereas the fully developed and characteristic lesion produced by spirochetes, fusiform bacilli, and vibrios is not abscess, but gangrene.

The sputum in the cases of pulmonary gangrene was foul smelling, grayish brown or grayish green, and occasionally blood streaked or bloody, and when washed free of oral mucus, was found to contain characteristic oral spirochetes, fusiform bacilli and vibrios (the Miller-Vincent organism). In the cases of abscess the sputum was whitish yellow, mucopurulent or purulent, and without an appreciable odor, and contained pyogenic organisms, usually staphylococci.

Arspenamine therapy was particularly efficacious in the cases of pneumonitis with sputum containing Miller-Vincent organisms. However, the most striking results were obtained in the cases of frank gangrene. Seventeen of 25 seriously ill patients who were given intensive treatment with arspenamine recovered. Large or maximum doses were administered routinely every two or three days except in some of the earlier cases. The favorable results in gangrene were in marked contrast to only 5 recoveries in 12 cases of bronchogenic abscess, a less severe process.

In general, transfusions, a diet high in calories, inhalations of oxygen, and supportive measures of all kinds were employed. Postural drainage was used routinely, as in the treatment of abscess, and should never be neglected.

The spirochetes, fusiform bacilli, and vibrios (Miller-Vincent organisms) of pulmonary gangrene are identical with those present in the mouth in practically all adults (in the interproximal spaces

between the gums and teeth) The lesion perhaps most frequently produced by these organisms is gingivitis

The authors report the following clinical and pathological observations

PULMONARY ABSCESS

Embolic pulmonary abscess Among the cases reviewed there were 23 of staphylococcal bacteremia or pyemia with embolic pulmonary abscesses Fourteen of the subjects were infants or children One patient recovered and 22 patients died In 16 cases a postmortem examination was made

The embolic abscesses were multiple and involved a number of lobes They were relatively small and associated with areas of suppuration elsewhere in the body representing a manifestation of pyemia or bacteremia The clinical evidences of pulmonary involvement in the acute cases were not particularly striking and were masked by the symptoms of general sepsis The mortality and the high incidence of the condition in infants and children are worthy of note

Bronchogenic pulmonary abscess There were 12 cases of bronchogenic pulmonary abscess Ten of the patients were males and 8 were infants or children There was a complicating bronchitis or pneumonia in 8 cases The condition developed following operation under general anesthesia in 3 cases and following operation under local anesthesia in 1 case

This type of abscess is aspiratory and like embolic abscess occurs most frequently in infants and children It is usually limited to one lobe a lower lobe most frequently Five of the 12 patients recovered The symptoms are those of pneumonia, which the abscess complicates, but resolution fails to take place When the abscess begins to break down abundant material at times blood streaked is expectorated An odor when present is not distinctive The odor is never foul like the odor of gangrene Clubbing of the fingers may occur with surprising rapidity

The greater incidence of bronchogenic abscess in children than in adults probably depends on the fact that the oral flora contains more staphylococci in childhood than later in life and that before the tenth year of age children ordinarily do not harbor appreciable numbers of spirochetes fusiform bacilli and vibrios in their mouths

PULMONARY SPIROCHETOSIS

The invasion of the pulmonary tissues by Miller Vincent organisms may induce bronchitis pneumonia gangrene pleurisy, or a combination of these The organisms concerned are generally present in the mouth of persons over ten years of age They are to be found between the gums and the teeth and occasionally in the sinuses and the nasopharynx Not infrequently, when local conditions permit, they multiply enormously and cause from mild to severe inflammation and gangrenous ulceration Patients

and physicians are frequently unaware of mild lesions which may be teeming with these organisms free on the surface in the upper respiratory tract Gingivitis with these organisms about the rear molars is especially common

Between the time of aspiration of the infected material and the onset of symptoms several days usually elapse However, symptoms may be apparent within two days or may not appear until after fourteen days

Pulmonary gangrene Among the cases reviewed there were 39 of pulmonary gangrene (over 3 times the number of cases of bronchogenic abscess observed) Thirty two of the subjects were adults The youngest patient was three years of age and the oldest sixty nine Seventeen cases followed operation under general anesthesia 4 followed operation under local anesthesia and 17 had no relation to operation

Pulmonary invasion in these cases usually began with fever and occasionally with chills, pain in the chest, cough and expectoration, symptoms which usually led to the diagnosis of pneumonia At first the physical signs and roentgen observations could not be differentiated from those of ordinary pneumonia However, the history and the character of the sputum made possible the prompt diagnosis of Miller Vincent infection The sputum which at first may be mucopurulent and occasionally hemorrhagic and without an appreciable odor, soon becomes abundant, thin, gray or brown green and intensely foul, and microscopic examination reveals the characteristic oral spirochetes, fusiform bacilli and vibrios (Miller Vincent organisms)

Pulmonary gangrene and pulmonary abscess should not be confused with each other as they are distinct and well defined diseases Failure to recognize this fact may result in unnecessary loss of life since pulmonary gangrene with characteristic etiology and pathology may be combated by specific therapy which is much more efficacious than are the measures for pulmonary abscess

It is of great importance to make the diagnosis of pulmonary infection due to the Miller Vincent organism as soon as possible in order to prevent the extensive gangrenous ulcerative processes which this organism produces Antisyphilitic therapy with arsphenamine is most effective when it is begun early Arsenic in the form of arsphenamine or neoarsphenamine, administered to the point of causing toxicity is the most valuable single measure in the treatment of pulmonary gangrene

Oxygen therapy is often of value and in the chronic stages may be necessary Besides pulmonary spirochetosis and pulmonary gangrene caused by the Miller Vincent organisms the authors had cases of pneumonia caused by the same organisms and infection of the bronchi and pleura Detailed descriptions of these organisms are included in the article The important clinical facts in the 53 cases reviewed are summarized in a chart

JOHN J. MALONEY, M.D.

Wangensteen, O. H. The Pedicled Muscle Flap in the Closure of Persistent Bronchopleural Fistula. *J Thoracic Surg*, 1935, 5: 27

Wangensteen first discusses the treatment of persistent bronchial fistula by the use of Abrasanhoff's method of pedicled flaps from the latissimus dorsi muscle. He has used this method successfully in seven cases. Among the causes of such fistula he includes (1) inadequate drainage of pleural exudate, (2) surgical drainage of pulmonary suppuration, (3) lobectomy and pneumectomy, and (4) spontaneous rupture of a lung abscess into the pleural cavity.

Bronchial fistulae persist because of (1) continued pulmonary suppuration, (2) the presence of rigid tissues adjacent to the fistula, and (3) pleural thickening which prevents the closure of bronchial stomas.

In discussing the various methods of dealing with bronchial fistulae, Wangenstein mentions

1 The necessity of waiting until pulmonary suppuration subsides

2 The mobilization of sufficient pulmonary tissue about the fistula to permit burying of the lung tissue

3 Thoracoplasty to approximate adventitious tissue around a fistula

4 The use of curettage, silver nitrate, or 1 per cent. flavine excision of the fistulous tract followed by suture and inversion plastic sliding of adjacent skin over the fistula, and the use of Beck's paste

5 Physiotherapeutic methods such as X-ray or radium irradiation

6 Abrasanhoff's method of applying pedicled muscle flaps over the fistula

The author describes the technique of the Abrasanhoff method and presents an illustration showing the various steps. He discusses his cases in detail.

In the second part of the article Wangenstein describes a ribbining operation of the intercostal muscles. The slits are made through the exposed periosteum after preliminary subperiosteal resection of the ribs in the area to be ribbined. The ribbons are tucked into the base of the empyema cavity and thus do away with the presence of a dead space. The advantages of the ribbining of the intercostal muscles are, first preservation of the integrity of the muscles and their blood supply, and second, the prevention of abdominal muscle paralysis by preservation of the integrity of the intercostal nerves. The steps of the operation are shown in an illustration.

MINAS JOANNIDES, M.D.

Kjergaard, H. Cystic Lungs. *Acta med Scand* 1935, 86: 407

After briefly reviewing the anatomy of congenital lung cysts, the author describes the following three groups which are clinically the most important

1 Large solitary tracheobronchial lung cysts. Symptoms: Compression and, when the cyst is infected, fever and a purulent and fetid sputum. Dermoid cysts. Compression, hemoptysis, and sputum containing hairs.

2 Superficial valve vesicles. On rupture, simple pneumothorax occurs.

3 Honeycomb lungs. a Extensive honeycomb lungs in the newborn. Symptoms: cyanosis and attacks of suffocation. b Honeycomb lungs in children. Symptoms: recurrent bronchitis and bronchopneumonia. c Honeycomb lungs in adults. Symptoms: intermittent infection of the cysts with coughing, expectoration, fever, emaciation, and hemoptysis. The disease is often mistaken for pulmonary tuberculosis with cavity formation.

It is emphasized that congenital cysts of the lungs do not always give rise to all the symptoms mentioned. Even very large and numerous cysts of both lungs may cause no inconvenience throughout a long life.

Cystic lung is not a disease *per se*. It is merely a structural defect. Except for newborn infants with extensive cysts, the patients are not ill until the cysts become infected or rupture.

HEART AND PERICARDIUM

Beck, C. S. The Development of a New Blood Supply to the Heart by Operation. *Ann Surg*, 1935, 102: 801

Stimulated first by numerous observations over a period of years that blood vessels, occasionally of considerable size, extend between the heart and adjacent tissues joined by adherent scar tissue, and secondly by the gradually developing thought that this condition might be brought about surgically to provide an accessory blood supply to hearts with an inadequate blood supply, Beck and his associates have devised an ingenious operation which has been successful in many experiments and in several clinical cases. In the experiments the collateral vascular bed was supplied from the pericardium, pericardial fat, pedicled grafts of skeletal muscle, mediastinal fat, or omentum brought up through an opening in the diaphragm and sutured to the heart. The results of these experiments were as follows:

1 Almost total occlusion of the right and left coronary arteries was compatible with life if the heart had been provided with a collateral vascular bed. The occlusion was accomplished by means of silver bands gradually constricted at repeated operations.

2 Dye penetrated the myocardium through the collateral bed.

3 A physiological need of the heart muscle for more blood was necessary for development of the anastomoses. This need for more blood was induced by gradually shutting off the normal blood supply. Anastomoses were present to some extent between the skeletal muscle and the myocardium even without constriction, but did not become well developed unless the constricting bands were applied.

4 These anastomoses were demonstrable after two weeks.

5 Distribution of blood to every part of the myocardium is of vital importance. Even if one relatively small portion of the heart muscle is rendered ischemic by the peripheral ligation of four

or five arterial branches, ventricular fibrillation develops and this is routinely fatal. Therefore the amount of protection provided by collateral beds was dependent upon the degree to which the normal arteries had been occluded. Partial but not complete protection was provided if the right coronary artery was occluded in one stage, and practically complete protection was obtained if the occlusion was done in two stages. Almost routinely successful also was the ligation in two stages of the ramus descendens of the left coronary artery or the ramus circumflexus of the left coronary artery. The compensatory mechanism has been established after the first ligation and complete occlusion of the artery thereafter does not produce complete ischemia.

6 The collateral vascular bed acts not only as a new source of blood for the myocardium but also as an anastomotic bridge that transports blood from the bed of one coronary vessel to the bed of another where the blood flow is deficient.

*The presence of the new vascular bed was found not to have any harmful effect on the movement of the heart nor to cause any embarrassment of the general circulation. Adhesions to the heart may cause embarrassment by (1) producing chronic cardiac compression by constricting bands of scar tissue (2) anchoring the heart to the chest wall against which the heart must pull with every contraction or (3) producing sharp angulation of the heart from its normal axis and reducing its efficiency. None of these complications was encountered in the many experiments performed.

The first human being to be subjected to the operation was a man forty eight years of age who complained of sharp pains over the heart on exertion accompanied by dyspnea and dizziness and radiation of the pain to the left shoulder and down the left arm to the elbow. During these attacks he sometimes became cyanotic very dyspneic, and extremely apprehensive. The condition was diagnosed as coronary sclerosis with angina pectoris, generalized arteriosclerosis and mild hypertension. The operation was performed on February 13, 1935, under nitrous oxide oxygen anesthesia. After the insertion of the pectoralis major had been incised to mobilize the muscle a curved incision was made around the periphery of the left breast and the skin and fascia were reflected outward. The inferior portion of the left pectoralis major was then incised to make the graft. The third fourth and fifth costal cartilages were exposed by incising the rest of the muscle parallel with the sternum and separating it from the chest wall and the cartilages were removed. The intercostal bundles were incised laterally and left attached to the internal mammary artery. The pericardium was incised from base to apex, and the lining roughened by means of a burr as was the epicardium. The coronary vessels could not be felt with certainty. The pedicle graft was divided longitudinally and both pedicles were swung around the circumflex area of the heart and sutured laterally and posteriorly to the parietal pericardium.

The intercostal bundles and the medial margin of the pectoral muscle were then brought beneath the sternum and sutured to the parietal pericardium. With them, the internal mammary artery was brought to the surface of the heart. The reflected portion of the pectoralis major was sutured over the opening with the cut edges inverted to bring them into contact with the heart. The fascia was then sutured and the wound closed without drainage.

After seven months the patient is working as a gardener. He has no pain and he claims that he is cured. He was able to do light work two months after the operation and except for slight indigestion after meals for a few weeks following the operation, he has had no untoward symptoms. In all seven patients have been operated upon by the described method. In one other case a definitely beneficial result has been obtained. In four cases the length of time that has elapsed since the operation is too short for judgment of the result. One patient died a week after the operation from a thrombus in the left common iliac artery which had developed at the site of an atheromatous ulcer in the abdominal aorta. When examined at autopsy the condition of the operative field was found satisfactory.

JAY EUGENE TREMANE, M.D.

ESOPHAGUS AND MEDIASTINUM

Harrprecht K. Congenital Esophageal Stenosis
(Ueber angeborene Oesophagusstenose) 1934 Kiel
Dissertation

The author first reports a personal case of esophageal stenosis. The patient was a seven year old girl who was well developed mentally and very thin, weighing only 19 kgm. From soon after birth up to the time of her admittance to the hospital she had vomited a large amount of her food. Her appetite remained good. Only soft foods in small quantities and administered very slowly were tolerated. Recently, the symptoms had greatly increased and her general condition had become worse.

Sounding with an ordinary stomach tube revealed an unsurmountable obstruction about 24 cm from the front teeth. The roentgenogram showed a long contraction of the esophagus at the level of the bifurcation of the trachea and above this a marked dilatation. Above the cardia the esophageal lumen was normal. A diagnosis of congenital stenosis of the esophagus was made. There were no anamnestic or clinical features to indicate any other pathogenesis of the condition.

Under mucosal anesthesia induced with 2 per cent procaine the stenosis was dilated to accommodate a Charrière bougie No. 8. After the child had recovered under high caloric feedings and had gained 4 kgm in weight a Witzel gastrostomy was done under ether narcosis. She was then fed exclusively through the fistula. The pains which had recently developed ceased when the esophagus was thus placed at complete rest and repeated sounding could be done. The Charrière bougie No. 8 again

passed smoothly through the stenosis. Under the fluoroscope the margins of the stenosis were visualized with contrast medium after a ureteral catheter had been introduced through the nose (22.8 cm). The catheter was carefully passed into the stomach and brought out through the gastric fistula. Two heavy silk threads were then pulled through with it and left in position. After ten days the stenosis was dilated from 4.9 to 9 mm. by the endless sounding. The roentgenogram revealed marked retraction of the dilatation above the stenosis. During dilatation, the child complained of tension pain behind the sternum. After she had been at home ten days the old symptoms recurred. Within thirteen days it was possible to dilate the stenosis to 1.03 cm. After twelve days of rest there was sudden pain on dilatation although an opening of 1.03 cm. was attained. It is to be assumed that the rather rapid dilatation from 4.9 mm. to 1.03 cm. and the feeding from above had provoked renewed ulceration and spasm. Subsequent treatment was changed in that the forward part of a Nelaton catheter of proper width was introduced between two silk threads until it was directly at the site of the stenosis, and left in place for four hours. Since then, the child has been free from symptoms and the fistula has been closed surgically. The improvement in the general condition, however, has not kept pace with the relief of the stenosis. There is a productive cough, which may be due to tuberculosis, bronchiectasis, or an esophagotracheal fistula with a very narrow communication. The dilatation is repeated at intervals of three or four weeks.

Following this report there is a description of the normal esophagus and its embryology (Ivan Brodman). The author then describes the congenital anomalies of the esophagus reported in the literature—complete absence of the esophagus, complete or

partial duplication, and so called uncomplicated esophagotracheal fistulas with normal development which, however, are joined by a fine fistula. The anomalies of particular interest with reference to the case reported are the following partial obliterations.

1 A simple blind ending. This is usually found at the junction of the pharynx and the esophagus or in the upper portion of the latter. The longer or shorter atretic portion is followed by a normal lower end (Kreuter's uncomplicated esophageal atresia).

2 A simple blind ending associated with a communication between the esophagus and the trachea. This is the most common of all congenital malformations of the esophagus.

3 The so called membranous obstruction and the ring or tube shaped stenosis with or without tracheal communications.

4 Congenital dilatation and ectasia of the esophagus.

Marked congenital anomalies of the esophagus are often associated with other malformations.

There is then an exhaustive discussion of the much debated question as to the cause of congenital esophageal stenoses. The theory that they are the result of fetal inflammatory processes has been practically abandoned. More tenable are the theories based on embryonic developmental processes. Of fundamental importance from this point of view were the studies of Tandler on atresias of the duodenum, upon which Kreuter's studies of atresias of the esophagus were based. Kreuter's findings have been confirmed by most investigators.

In addition to these embryological theories there is the developmental mechanical theory (Schmitz), to which the author attaches special importance.

In conclusion Harpprecht presents an extensive collection of statistics from the literature.

(A. FRAENKEL) LEO M. ZIMMERMAN M.D.

SURGERY OF THE ABDOMEN

GASTRO INTESTINAL TRACT

Lang H J Perforation of Gastric and Duodenal Ulcers Into the Free Peritoneal Cavity. Experiences and Observations in 152 Cases (Ueber den Durchbruch von Magen und Zwölffingerdarmgechwüren in die freie Bauchhöhle. Erfahrungen und Beobachtungen an 152 Fällen). *Beitr. klin. Chir.* 1935 161 143

This report is based on the author's experiences in the treatment of 152 cases of perforated gastric and duodenal ulcer in the years from 1920 to 1934. During this period there was an unexplainable increase in the incidence of perforation in the patients with ulcer who were admitted to the hospital. Half of the patients with perforation were laborers of the type usually found in large cities. Many were chronic alcoholics. The majority were undernourished and weak because of protracted gastric disturbances and inability to follow difficult dietary régimes because of occupational or home conditions.

Twenty-two (14.5 per cent) of the patients were women. Seventeen (77.3 per cent) of the women died. Twelve of the women were not operated upon, being moribund when they were admitted to the hospital. The average age of the women was sixty-three years, a fact suggesting that in the differential diagnosis of doubtful abdominal conditions in women of advanced age the possibility of perforated peptic ulcer should be borne in mind.

Most of the perforations occurred during the winter. No familial predisposition could be established. The incidence was highest in chauffeurs and waiters. Smokers were well represented.

A significant observation was increased severity of the gastric distress which may be interpreted as suggesting imminent perforation. This so-called augmented premonitory pain occurred in 50 or approximately one third of the cases. Vomiting, an increased pulse rate and the temperature were of no value in the differential diagnosis.

Forty-five per cent of the patients were operated upon within six hours after the perforation, 29.2 per cent, between six and twelve hours, 9.3 per cent, between twelve and eighteen hours and the rest after eighteen hours. Early operation was therefore possible in fewer than half of the cases. Board-like rigidity of the abdominal wall was always present. The differentiation from perforated appendix was very difficult. In advanced cases complicated by diffuse peritonitis it was practically impossible. The pain referred to the shoulder which was described by Oehler as of some value. Pneumoperitoneum is pathognomonic of ulcer perforation, but was not always demonstrable. The gastric crisis of tabes simulates ulcer perforation

very closely, but a leucocytosis with a shift to the left suggestive of perforation is not found in the undifferentiated blood picture of gastric tabes.

It is often very difficult to find the site of the perforation. Occasionally there are multiple perforations. A second perforation was overlooked in 5 of the cases reviewed. There were 15 precordial ulcers, 12 ulcers in the pyloric region and 10 ulcers in the horizontal part of the duodenum. All of the lesions except 1 were on the anterior wall. The 1 exception was not found during operation, probably because the patient's poor condition, due to a perforation which had occurred ninety-six hours previously, did not permit extensive manipulation.

The most effective treatment was simple closure. This was always done with 2 rows of sutures. The first row consisted of interrupted catgut sutures going through all 3 layers. The second was of silk and included only the serosa and muscularis. The sutures should be inserted parallel with the long axis of the stomach so that when the suturing is completed the row will be at right angles to the long axis of the stomach. In the cases reviewed, gastroenterostomy was done only when stenosis appeared inevitable. The Newman (Braun) omental cuff drainage was used only in the most desperate cases. In a high percentage of the cases conservative treatment yielded satisfactory end results and primary resection was avoided.

The mortality of 40.6 per cent was secondary to the delay between perforation and surgical intervention. The poor condition of most of the patients led to many postoperative complications. Half of the mortality was due to peritonitis. There were 31 cases of primary peritonitis. In 10 operation was not performed, in 4, the suture line leaked, and in 5, a second perforation was neglected. Twelve patients died of pneumonia, 2 of empyema with a subphrenic abscess and 5 of subphrenic abscesses alone. Two patients not operated upon died of erosion of a blood vessel and peritonitis, 2 of paralytic ileus, 1 of volvulus of the small bowel, 1 of gastric atony, 1 of peritonitis with pulmonary tuberculosis, 3 of syphilis with aortic insufficiency (no peritonitis) and of late postoperative perforation of another ulcer.

The majority of the patients were poor operative risks.

(BODE) SAMUEL J. LOGELSON, M.D.

Friedemann M. The Health of 360 Persons From Ten to Seventeen Years After Radical Operation for Gastric Ulcer (Ueber den Gesundheitszustand von 360 Personen 10-17 Jahre nach der Radikaloperation wegen Magengeschwüerskrankheit). *Zentralbl. f. Chir.*, 1935 p. 1456

Of 360 patients with gastric ulcer, 207 were subjected to a Billroth I and 153 to a Billroth II resec-

tion Three hundred and twenty four were re-examined by the author from ten to seventeen years after the operation. Of major interest in the follow up were recurrences, gastritis, the blood picture, the blood sugar in the presence of recurrence of the symptoms, disease of adjacent viscera, and the general condition as affected by psychic influences.

Unfortunately the patients were not classified according to the number of years that had elapsed since the operation. The result of the operation was designated as "good+" when the patient was free from symptoms and tolerated a liberal general diet as "good—" when he was free from symptoms only when certain foods were eliminated from the diet, and as "fair" when he still had symptoms but the disturbances were less severe than before the operation.

Of the 207 patients subjected to the Billroth I operation, 67 (32.4 per cent) showed a good+ result, 83 (40.1 per cent), a good— result, 42 (20.3 per cent), a fair result, and 15 (7.2 per cent) a poor result. Of the 153 subjected to the Billroth II operation 56 (36.9 per cent) showed a good+ result, 65 (42.4 per cent), a good— result, 23 (15 per cent), a fair result, and 9 (5.7 per cent), a poor result.

The Billroth II operation therefore gave slightly better end results than the Billroth I operation. When these patients were operated upon the author resected a smaller gastric segment than is now customarily excised. He believes that more extensive resection will probably decrease the incidence of recurrence, but may be followed by other complications. (WERNER BLOCK.) SAMUEL J. FOCLESON, M.D.

Kerr, H. D., and Berger, R. A. Bone Metastasis in Carcinoma of the Stomach. *Am J Cancer* 1935, 25: 518.

The reported incidence of bone involvement in cases of carcinoma of the stomach ranges from 1 to 22 per cent but is usually under 6 per cent. It obviously depends upon whether the observations were made at autopsy or roentgenographically and upon the thoroughness of the search.

In the literature the authors have found 143 apparently authentic cases, with a case or two of direct invasion and 1 doubtful case. To these they add 3 cases with roentgen evidence of osseous involvement and 2 in which osseous metastases were found at autopsy.

The discussion includes the blood picture, site of metastasis, type of metastasis, type of primary lesion, method of metastasis, and the age of the patient. The article is concluded with the following summary:

1 Bone metastasis from carcinoma of the stomach is a relatively uncommon finding.

2 One hundred and forty three cases have been collected from the literature. To these, 5 cases have been added.

3 Metastasis to bone is most frequent at the sites of the red marrow—spine, ribs, femora, sternum, and pelvis.

4 Metastases are either osteoplastic, osteoclastic, or both, regardless of the characteristics of the primary lesions.

5 The site, size, and type of the primary tumor seem to have no relation to the appearance of the osseous involvement.

6 Bone metastasis is more frequent in the relatively young, but may occur at any age.

7 Dissemination probably occurs through the blood stream.

8 Some cases present an anemia which cannot be distinguished morphologically from a primary type and may show a large percentage increase in immature cells of the myeloid series.

CARL P. STEINKF, M.D.

Wakeley, C. P. G., and Willway, F. W. Intestinal Obstruction by Gall Stones. *Brit J Surg* 1935, 23: 377.

Acute mechanical obstruction of the bowel by a gall stone is a well recognized though uncommon entity. Most of the gall stones gaining entrance to the intestinal tract are voided naturally. Stones sufficiently large to cause bowel obstruction never pass the entire length of the bile duct, but enter the bowel by a process of ulceration. Such stones are usually more than 1 in in diameter. Because of the large number of symptomless cases of gall stones, obstruction of the bowel by impacted gall stones is not likely to become infrequent. In such cases there is always the possibility of symptomless ulceration with subsequent obstruction. After causing obstruction, a gall stone may become free and be voided naturally.

The authors review eleven cases of intestinal obstruction by gall stones in which operation was performed. The ages of the patients ranged from forty four to eighty one years and averaged sixty six years. All of the patients were women. There were 3 deaths, a mortality of 27 per cent. Not infrequently operation was delayed because the obstruction tended to be intermittent. Four of the patients gave a definite gall bladder history. The others complained of dyspepsia, indigestion, or other vague symptoms. A pre operative diagnosis of intestinal obstruction due to a gall bladder stone was made in only two cases. In all of the cases a stone was impacted in the small bowel. One patient had a second stone impacted in the rectum. Six patients had a cystoduodenal ulceration, and one, an ulceration of the common duct. In the others it was impossible to be certain which form of fistula was present.

With regard to the mode of production of biliary fistula, the authors state that the gall bladder seems to have a natural tendency to become adherent to adjacent structures. Gall stones favor fistula formation by causing pressure necrosis of the gall bladder wall. Fistulae so produced open most frequently into the duodenum or colon. After the stones have been successfully extruded into the bowel, contraction of the fistula begins. This is followed by shriveling of the gall bladder. The projecting gall stone may be

lodged in the lumen of the intestine for some time before it becomes dislodged. Specimens showing the different types of biliary fistula are described.

JOHN W. NUTZEL, M.D.

Hartman H. R. Lesions of the Small Bowel Other Than Peptic Ulcer. *Med. Clin. North Am.* 1935 19: 365

A search of the files of the Mayo Clinic for the last five years yielded the histories of 466 cases of lesions of the small bowel exclusive of duodenal ulcers, duodenitis with a probable relationship to ulcer, and gastroduodenal ulcers.

Of the 52 neoplasms in the cases reviewed, 31 were malignant and 21 benign. Of the malignant neoplasms, 22 were carcinomas and 9 were sarcomas. No segment of the small bowel in these cases, escaped either carcinoma or sarcoma. When it is known that a patient has a primary carcinoma in some part of the gastro-intestinal tract, there is only a 1 chance in more than 160 that it is in the small bowel. During the later years of life, carcinoma occurs in all divisions of the small bowel. The history is comparatively short and the symptoms may be referable to the bowel. Abdominal pains or gastric distress may be mistakenly attributed to ulcer or to disease of the gall bladder. Indications of intestinal obstruction, either present at the onset of symptoms or developing as the disease progresses, should impel the clinician to ask for a roentgen examination to determine the condition of the small bowel. His attention should be directed to the small bowel particularly if the pain tends to have a parumbilical or low abdominal situation. Occult or gross hemorrhage may occur. Anemia and the persistent presence of occult blood in the stool must be explained on the basis of a gastro-intestinal lesion which may be in the small bowel. The latter possibility should be investigated by roentgen examination if the lesions cannot be found elsewhere. The roentgenologist finds little evidence upon which to base a diagnosis and the manifestations are usually limited to signs of obstruction with dilatation and prominent valvulae conniventes or occasionally, a filling defect momentarily observed as the opaque bolus passes along the 22 ft. of small bowel. The roentgenologist is entirely unable to distinguish the type of the tumor. Metastasis is common. It may be extensive if the lesion is growing rapidly as a malignant lesion of the small bowel is seldom diagnosed early. Sarcoma occurs less frequently than carcinoma. The clinical history and physical and roentgen signs differ little from those of carcinoma. The differential diagnosis must be made by microscopic examination of tissue.

In 1933, Rankin reported a total of 35 cases of benign neoplasm of the small intestine observed at the Clinic. Since then 9 additional cases have been encountered. As a rule the tumor was found unexpectedly at operation, but occasionally the diagnosis was made by roentgen examination. Symptoms, when present, often resembled those of ulcer.

Hematemesis and melena sometimes occurred and, in a few cases, were prominent signs. In a few cases an elusive tumor was palpable. About half of the patients with symptoms from the tumor had signs and symptoms of obstruction. These patients were of 2 classes. In one class there was a sudden, sharp, colicky pain with abdominal distention, nausea, and vomiting. In the other, there were slowly increasing signs of distention, borborygmi, and pain, perhaps with visible peristalsis. The acute symptoms of obstruction are caused by intussusception while the more slowly developing signs of obstruction are due to gradual encroachment of the tumor on the lumen of the bowel. Intussusception in the earlier years of mature life may be suspected to be associated with a benign tumor. When the diagnosis of a benign or malignant neoplasm of the small bowel is made preoperatively, it must be based on roentgen evidence.

The most common benign neoplasms found were myomas. These were of various types. Three were in the duodenum, one was in the jejunum, and three were in the ileum.

Under the heading 'miscellaneous lesions of the small bowel' were classed 414 cases. Meckel's diverticulum was found in 97 cases and other forms of diverticulum in 84 cases. As would be expected, the second most frequent location of acquired diverticula was the duodenum. Seventy-one diverticula were in the duodenum, 10 in the jejunum, and 3 in the ileum. Diverticula of the small bowel tend to be larger than diverticula of the large bowel and as a rule have large gaping orifices. The author was unable to find any proved instance of inflammation of an acquired diverticulum of the small bowel in the cases reviewed.

The lesion of the small bowel next in frequency to diverticula in the reviewed cases, including those of neoplasm, was fistula. There were 77 cases of fistula. All but 8 of the fistulas developed after an operation. The ileum was involved in 58 cases, the duodenum in 11, and the jejunum in 6. Two fistulas not specifically located probably involved the jejunum or ileum.

Intrinsic occlusion of the lumen of the small bowel occurred in 52 cases. By 'ileus' is meant colicky pain arising from a segment of the bowel as the result of a local failure of peristaltic function due to an undetermined cause. Dilatation of the bowel is usually extreme and the patient's condition critical. Therefore detailed exploration is not possible. Only once was the lesion causing ileus accurately located and then, oddly enough, it was found in the duodenum. In the 27 other cases in which a diagnosis of ileus was made, the paralyzed segment was not found, but was either in the ileum or jejunum. Volvulus occurred in 16 cases. In 1 case it was in the jejunum and in 9 cases in the ileum. In 6 cases the affected segment was not determined. In all cases in which the cause was discovered, it proved to be adhesions. Intussusception occurred in 8 cases. When the segment involved in the intussusception was determined it was found always to be in the

ileum. The patients were children ranging in age from four months to fifteen years. However the condition can occur in the mature years of life. Symptomatically, these lesions are suggested clinically only by signs of obstruction of the small bowel, namely, cramp like pains low in the abdomen which are sudden in onset and often para-umbilical in situation. Cramps from obstruction of the small bowel recur at shorter intervals than cramps from obstruction of the large bowel. Other than these features, the symptoms of obstruction of the small bowel resulting from ileus, volvulus, or intussusception are the same as those produced by other varieties of obstruction. The majority of the 32 cases of inflammation of the small bowel presented symptoms of obstruction of the bowel. On the other hand, diarrhea was a frequent symptom and occasionally pain and tenderness were present. The diagnosis was made, of course, from the roentgen signs of obstruction and the effacement of the mucosal folds of the small bowel that indicate inflammation. At operation the inflamed segment sometimes appeared as a mass resembling that produced by tuberculosis or malignant disease, but microscopic examination of the removed tissue revealed non-specific inflammation occasionally with marked edema and giant cells. Edema of the tissues was often apparent grossly. The lesions were in the duodenum in 1 case, in the jejunum in 7 cases, and in the ileum in 18 cases. In 6 cases their site was not recorded.

The 32 cases of tuberculosis of the small bowel were classical according to symptoms. Usually the intestinal lesion was associated with tuberculosis elsewhere, often with pulmonary tuberculosis. This series confirmed the observation that tuberculosis of the bowel is usually confined to the terminal part of the ileum and the proximal part of the colon. There were 7 cases of simple, non specific ulcer of the small bowel. Operation was performed in 4 cases because of unexplained melena which in 3 cases was associated with chronic anemia and in 1 case with cramp like abdominal pain. Of 3 patients who were operated on because of obstruction, two had complete obstruction of the bowel and 1 suffered from cramp like pains, distention, and diarrhea characteristic of incomplete obstruction. Simple ulcers of the small bowel are rare.

Partsch Tumors of the Colon (Dickdarmgeschwuelste) *Zentralbl f Chir*, 1935, p 1277

This is a report on experience since the report of Nordmann on the German Surgeon's day in 1926. The distribution of the site of carcinoma in any particular region of the bowel shows, in all statistics, unusual uniformity. A third of the tumors are in the right half of the colon, a third in the sigmoid, and a third in the left portion of the colon and the transverse colon.

With improvement in early diagnosis, operative results must improve. Approximately from seven to ten months elapse after the appearance of the first symptoms before carcinoma of the colon is diag-

nosed. This period must be markedly reduced. In the beginning general abdominal symptoms, such as fullness and borborygmus, are outstanding. The feeling of fullness is more common in the presence of tumors of the left side than in the presence of tumors of the cecum because in the cecum a growing neoplasm causes hardly any obstruction to the passage of the still rather fluid intestinal contents.

In roentgenological examination the oral administration of contrast media is strictly to be avoided if ileus is to be prevented. Repeated examination with a barium enema, with demonstration of the membrane relief, is necessary to exclude the presence of tumor with certainty. In some cases clarification of the disease picture requires exploratory laparotomy. Before operation the patient should be carefully examined with particular regard to the cardiovascular system, kidneys, and intestinal function, and everything possible must be done to counteract the damage generally caused by the presence of a tumor and to prepare for the serious procedure ahead. For pre operative preparation the best methods of improving the general condition are small repeated blood transfusions, the intravenous infusion of dextrose solutions, and a light, high calorie, low residue diet. The investigations of Rankin on the use of intraperitoneal vaccination to increase the resistance of the peritoneum are worthy of note.

In regard to the question of single or multiple operations there is still no uniformity of opinion. It is certain that any state of ileus, any increase in tension of the colon above the stenosis, or any severe infection must be taken care of before resection of the tumor can be carried out, whether this is on the right or the left side. The singular fact that in uncomplicated cases the mortality of multiple and one stage resections is practically the same explains the favor in which the one stage resection is held by German intestinal surgeons. It is interesting to note how, in the course of time, those operations are attempted which, through changes in technique, try to make certain the unquestioned advantage of the one stage resection.

(LEHRBECHER) CLAUDE F. DIXON, M.D.

Cutler, O. I. Mild Acute Appendicitis Appendiceal Obstruction *Arch Surg*, 1935 31 720

To determine why benefit may result from the removal of appendices showing little evidence of inflammation, the author compared the complaints of a group of patients with the findings at operation and the condition of the appendices removed. The appendices studied consisted of 344 removed in the past few years in one hospital. This series represented cases of frankly acute inflammation of the appendix, a number of cases in which removal of the appendix was done as a routine procedure at operation on some other organ, and cases of so called chronic appendicitis. The observations made in the different groups of cases are recorded separately and briefly correlated. The appendices removed at the

time of operation on some other organ were used as a control group.

Among the 344 cases studied there were 103 in which the appendix appeared to be the site of trouble but presented only slight or no evidence of an active inflammation. The most constant and impressive evidences of abnormality in the 103 appendices were indications of a functional disturbance rather than of inflammation. The appearance of the appendices and a few clinical observations in the chronic group of cases are discussed. Statistics concerning the 77 cases of frankly acute inflammation are briefly given. There were 8 cases of healing acute appendicitis in this series and 34 of early or mild acute appendicitis.

Cutler believes that the failure of the appendix to empty properly is a common cause of repeated attacks of pain in the right lower quadrant of the abdomen. He states that such pain is frequently associated with reflex nausea and vomiting. In many cases the cause of obstruction is spasm of the muscularis of the ampulla of the appendix. Elevation of the temperature and leucocyte count appear not to occur unless acute inflammation is present. Cutler believes that until some better method of relieving obstruction is found removal of the obstructed appendix is warranted. Appendiceal colic due to obstruction may be most distressing. The study of the control series of cases indicated that some patients may have appendiceal obstruction and complain of it relatively little. Many attacks of acute appendicitis are very mild. Repeated mild attacks may cause thickening of the submucosa and narrowing of the lumen with resulting appendiceal obstruction and obliteration of the lumen of the appendix. Frequently attacks of acute appendicitis are very mild and unrecognized. A study of the blood count particularly the Schilling count is of definite aid in determining the severity of the condition. Since it is not possible to predict accurately the course of events in the appendix early operation is urged.

EMIL C. ROBERTS, M.D.

Stewart Wallace A. M. Pylephlebitis Complicating Appendicitis and Its Treatment by Ligation of the Mesenteric Veins. *Brit J Surg* 1935 23 362

The author reports the case of an unmarried girl eighteen years of age who was admitted to the hospital on March 1, 1932 with a three days history of abdominal pain and vomiting and with obvious signs of general peritonitis. At operation pus was found in the general peritoneal cavity and welled up out of the pelvis. Cultures revealed colon bacilli and non hemolytic streptococci. The appendix was gangrenous and perforated. The appendix was removed and a large rubber drainage tube inserted into the pelvis. Four days later the patient complained of a colicky pain in the abdomen and had two definite rigors. On the following day another severe chill occurred. The edges of the wound were red and inflamed and the drainage sinus discharged foul smelling pus. Taylor made a pre-operative diag-

nosis of ascending mesenteric thrombophlebitis and portal pyemia.

At a second operation the superior mesenteric vein was found to be thrombosed from the extreme radicals supplying the cecal area to within 1 in. of its junction with the splenic vein. The liver was swollen. There was no evidence of infarction of any part of the bowel. The superior mesenteric vein was approached through the posterior layer of the transverse mesocolon and ligated proximal to the upper limit of the thrombus. The ligation was followed by sudden and marked engorgement of all the colic veins. The abdomen was closed without drainage. The patient was extremely shocked, but responded to stimulants and heat treatment. The following day her general condition had very greatly improved. She experienced no more chills. The liver engorgement subsided. A normal result followed an enema on the first day and thereafter the bowels moved normally. Convalescence was complicated by a pelvic abscess which finally drained into the rectum. The patient was discharged April 26 with the incisional wound completely healed. She later returned to work and has remained well for three years.

JOHN W. ACRICK, M.D.

Gabriel W. B. Dukes C. and Bussey H. J. R. Lymphatic Spread in Cancer of the Rectum. *Brit J Surg* 1935 23 395

The authors report the procedure and the results of careful dissection of lymph nodes in specimens removed for malignancy of the rectum in 70 perineo-abdominal and 30 perineal resections.

The specimens were immediately stretched on frames to normal length and breadth and fixed in formalin. The lymph nodes were then carefully dissected and located with calipers on natural sized drawings. As many as 60 lymph nodes were found in a single specimen. The number average was 28. The condition of the lymphatics was studied in the perineo abdominal specimens as high as the inferior mesenteric and paracolic nodes. The latter were affected in only 1 advanced case.

Glandular metastasis was found in 62 of the 100 cases. In half of the cases 3 or fewer lymph nodes were involved. The fact that so many patients received surgical treatment in the early stages of lymphatic involvement is real evidence that rectal cancer spreads slowly from gland to gland. If lymphatic spread had been rapid we should have expected to find the cases falling mostly into groups with no glands or with several glands involved.

Lymphatic dissemination is described as occurring first in the perirectal tissue in the immediate vicinity of the growth. After this a continuous spread takes place along the lymph nodes accompanying the superior hemorrhoidal vessels. Until these channels are all blocked, no downward or lateral lymphatic spread is found.

More than 2,000 lymph nodes were examined. Those considered negative grossly were usually diagnosed correctly, but of those considered cancerous

grossly microscopic examination revealed diagnostic error in 61 per cent. Hence the most common error was the presumption that lymph nodes enlarged as the result of inflammation were affected by metastasis.

Cases in which dissection showed that glandular spread had reached the point of ligation of the blood vessels were classified as C_2 cases. In such cases the prognosis was grave. Those in which the point of ligation was not reached were classified as C_1 cases. In this group the prognosis was better. Of the 62 cases in which metastasis was recorded, 43 were classified as C_1 and 19 as C_2 cases. In a few cases distant metastasis took place when the lymphatics were free. These were presumed to be instances of vascular spread.

The authors present these 2 groups as an apparent explanation for the survival of a certain percentage of patients with glandular involvement. It is assumed that those surviving were in the C_1 group and that in this group all affected tissue was removed. There is reason to suspect that in cases of the C_2 group lymph nodes at a higher level were involved.

Twenty four illustrative cases are presented with drawings. The high proportion of C_1 cases in which the condition was clinically operable encourages the performance of the combined excision. Of 70 specimens removed by perineal abdominal excision only 11 belonged to the C_2 group.

The authors conclude that careful dissection of operative specimens offers a valuable prognostic aid in cases of cancer of the rectum in which lymphatic spread has taken place. CLAUDE F. DIXON, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Judd, E. S., Snell, A. M., and Hoerner, M. T.
Transfusion for Jaundiced Patients. *J. Am. Med. Ass.*, 1935, 105: 1653.

Almost every one is familiar with the beneficial effects of the transfusion of blood, which are reflected in the decrease in the coagulation time of the blood and in the general improvement of the jaundiced patient. However, the reason for these changes has always been obscure. The method of transfusion employed most frequently at present involves the use of sodium citrate as an anticoagulant. Because sodium citrate in itself has been shown to lower the coagulation time, it might be argued that the improvement that follows the administration of citrated blood is attributable to the sodium citrate. However, this cannot possibly be true, for numerous investigators have found that equally good, or even better, results can be obtained by utilizing whole blood. For several months Judd, Snell, and Hoerner adhered to the plan of using whole blood in transfusions in order to obtain comparative data on a large series of jaundiced patients. For a while they thought that there was less tendency to bleed than when citrated blood was used but further experience seemed to indicate that the

transfusion of citrated blood is of as much value as is the transfusion of whole blood. The best method of preventing hemorrhage is to give one or more transfusions of blood before operation. In some cases the transfusion of blood should be carried out both before and after surgical correction of the condition.

In one case the observation that a transfusion of blood appeared to relieve anoxemia led to further investigation of the problem. In another instance, repeated transfusion not only increased the hemoglobin content and thus the oxygen capacity of the blood but also improved the percentage of oxygenation of arterial blood. Of course these beneficial effects may be ascribable to improvement in the circulation, but they raise the question whether the hemoglobin produced by a diseased liver is abnormal.

The effect of transfusion on a very anemic patient who has hepatic disease is to improve the blood both quantitatively and qualitatively as a vehicle for the transportation of oxygen, the amount of oxygen for delivery to the tissues being thus increased. These changes may be attributable to alterations in the carbon dioxide, electrolyte, or protein content of the blood or to changes in its pH rather than to changes in the hemoglobin itself. This matter is still under consideration. The importance of the last mentioned factors does not detract from the clinical value of transfusions to patients who have hepatic lesions, for the anoxic and anemic patient apparently receives more benefit from transfusion than can be attributed to the amount of hemoglobin transferred. In these instances, repeated transfusions and inhalations of oxygen are indicated since they relieve the anoxemia whether it is of the anoxic or of the anemic variety and thus protect the hepatic parenchyma from the effect of prolonged low oxygen tensions.

Although it is difficult to determine the cause of anoxemia definitely, in cases in which the phenomenon appears, it is quite likely that it has some effect on the progress of the hepatic lesion. It already has been mentioned that reduced oxygen saturation of the arterial blood, produced experimentally, leads to atrophy of the central portion of the hepatic lobule. It may also render the hepatic tissue more vulnerable to influences that could otherwise have been withstood.

Several points in this work deserve additional discussion. Anoxemia is not present in every jaundiced patient, but if jaundice exists the degree of unsaturation appears to have some relationship to the general condition. It is possible also that anoxemia, when associated with hepatic disease, may have a deleterious effect on the progress of the hepatic lesion itself. Consequently, if the anoxemia persists, the liver is likely to be extensively injured and as a result the tendency to bleed will be materially increased.

In order to treat the condition intelligently, it should be borne in mind that the anoxemia may be of two types: (1) anoxic anoxia, which can be corrected by placing the patient in oxygen, and (2) anemic anoxia, which will respond to the transfusion of blood. In the latter instance there is not only an

absolute anemia, as is shown by the decrease in the amount of hemoglobin present but also a relative anoxia, because the ability of the hemoglobin to carry oxygen is diminished in certain cases. It can easily be realized that under the latter circumstances which appear to exist only in the anemic patient the administration of oxygen alone cannot relieve the situation. On the other hand marked benefit for which a theoretical basis has been demonstrated is apparently derived even from the comparatively small amount of blood given in the transfusion.

Without reference to the mechanism whereby anoxemia is produced in cases of hepatic disease it is apparent that transfusion has a favorable influence on it in at least three ways:

1. More hemoglobin is supplied the oxygen capacity of the blood being thereby increased. It should be remembered that erythrocytosis is one of the physiological responses to anoxemia and that because of a deficient production of hemoglobin this cannot readily occur in the presence of advanced hepatic damage.

2. There is a better saturation of the arterial blood with oxygen after transfusion. This may be the result of improvement in the general circulation or some change in the character of the blood as a physicochemical system.

3. The functional capacity of hemoglobin may be increased by transfusion. As pointed out this may involve factors other than the hemoglobin itself, the pH and carbon dioxide content of the blood may be of importance in this respect.

The authors state that the low mortality among their jaundiced patients in the past year reflects the value of the clinical application of these principles. They feel that the decrease in the mortality is attributable to the adequate pre-operative preparation, the selection of the opportune time for surgical treatment and the postoperative care as previously outlined. In any case they say transfusions of blood have been shown to be of both theoretical and practical value in the control of anoxemia and of the tendency to bleed that is associated with advanced hepatic disease.

Bengolea A J, Velasco Suarez C and Raices A.
The Content of Direct and Indirect Bilirubin in the Blood Serum. Its Importance to the Physician in Surgery of the Liver and Bile Ducts. (El dosage de las bilirrubinas: directa e indirecta en el suero sanguíneo. Su importancia en cirugía hepato biliar por los doctores). *Rev med quirurg de patol femenina* 1935 3 354.

This article reports a study of the amounts of direct and indirect bilirubin in the blood serum of normal persons and persons suffering from disease. There are the two forms of bilirubin that give direct and indirect reactions to the van den Bergh test. The authors describe the technique of their determinations in detail. They found that in health the blood serum contains only indirect bilirubin. This

is brought by the blood capillaries to the cells of the liver trabecula where it is transformed into direct bilirubin and eliminated through the bile ducts. If there are injuries or fissures in the cells of the trabecula, direct bilirubin may pass into the blood. If there is functional incapacity on the part of the liver which renders it unable to transform indirect bilirubin into direct bilirubin the blood may contain abnormally large amounts of indirect bilirubin. In the absence of excessive hemolysis the presence of an abnormally large amount of indirect bilirubin in the blood must be considered a sign of functional insufficiency of the liver. In cases of icterus in which the indirect bilirubin in the blood is not increased there is no insufficiency of the liver. The amount of direct bilirubin that passes into the blood under abnormal conditions depends on the extent of the injury of the trabecular cells. The authors present Fie singer's diagrams showing the bilirubin conditions in normal persons and persons with various forms of icterus.

The cases studied by the authors are reported briefly. They are divided into the following four groups: (1) those in which the serum contained normal amounts of indirect bilirubin and little or no direct bilirubin; (2) those in which the serum contained normal amounts of indirect bilirubin and moderate amounts of direct bilirubin; (3) those in which the serum contained normal amounts of indirect bilirubin and large amounts of direct bilirubin; and (4) those in which the serum contained large amounts of both direct and indirect bilirubin.

ARDELY Goss MORAN M D

Andrews E. Pathological Changes of Diseased Gall Bladders. A New Classification. *Arch Surg* 1935 31 767.

In an attempt to correlate the current pathological classification of gall bladder diseases and the clinical and bacteriological findings in these conditions 116 surgically excised gall bladders were studied. Fifty five were sectioned serially at intervals of 2 cm.

The bacteriological studies led to the conclusion that, in the average case of biliary colic infection, plays only a minor role. True ulceration of the mucosa is very rare when the gall bladder is removed without trauma and is fixed before autolysis takes place. Thickening is caused in most cases by edema and takes place almost solely in the subserous layers. In the reviewed gall bladders, empyema, though diagnosed frequently in the operating room, was never found. Invariably the milky fluid proved to be either an emulsion of calcium carbonate or of amorphous or crystalline cholesterol. The one definite finding was that the degree of inflammation in the wall depended on the patency of the cystic duct. The new classification, which is based on this finding is as follows:

A. Normal state of the gall bladder.
Slight infiltration often seen. cholesterosis.
presence or absence of stones. (The presence

of these signs formerly often led to a diagnosis of chronic cholecystitis)

- B Reaction to acute obstruction of the cystic duct
Uncomplicated type (formerly called chronic cholecystitis)

Infective type (formerly called acute cholecystitis)

Empyema (?)

Type with vascular damage (formerly called cholecystitis)

Mild cholecystitis

Ulcerative cholecystitis

Gangrenous cholecystitis

- C Reaction to intermittent obstruction of the cystic duct

Normal condition between attacks

Persistent irritation (usually mild)

- D Reaction to chronic obstruction of cystic duct
Uncomplicated type (formerly called chronic cholecystitis)

Acute re infection

Mild

Empyema (?)

Hydrops

- E Reaction to obstruction of the common duct
Acute or recent type (dilated and thin walled gall bladder)

Chronic type (shrunken and fibrosed gall bladder)

- F Neoplasms

GEORGE A. COLLETT, M D

Saint, J H The Late Results of Operations on the Biliary Tract in 359 Cases, with Cholecystographic Studies in 18 *Brit J Surg* 1935 23 299

Saint investigated the late results of operations on the biliary tract performed at Royal Victoria Infirmary, Newcastle upon Tyne, between the years 1907 and 1922. None of the cases had a postoperative history of less than ten years, and as the investigation covered a fifteen year period some of them were followed for as long as twenty five years. Questionnaires were sent to 790 patients and answers were received regarding 359. Three hundred and five of the patients are still alive.

To estimate the relative values of different operative procedures a basis of comparison is necessary. Saint chose as this basis the pathological condition found at the time of operation. In the biliary tract it is difficult to determine the extent of pathological changes exactly because the greater part of the tract is intrahepatic and therefore cannot be examined at operation. Since infection of the gall bladder undoubtedly extends to the intrahepatic portion of the biliary tract, operation does not remove all of diseased tissue present. Intrahepatic infection causes damage to the parenchymal cells of the liver with resulting hepatic inadequacy.

The results of the operations reviewed are classified as (1) complete relief, (2) partial relief, (3) no relief, and (4) those necessitating a secondary operation on the biliary tract.

In both acute and chronic cholecystitis with cholelithiasis, cholecystectomy was followed by better results than cholecystostomy. Excellent results were obtained in cases with and without cholelithiasis in which drainage of the common duct was combined with cholecystostomy or cholecystectomy. Although several patients had 2 or 3 recurrent attacks after the operation, they ultimately became entirely well. Carcinoma of the gall bladder did not develop in any case in which only cholecystostomy was done. The percentage of patients requiring a secondary operation was 5 times greater after cholecystostomy than after cholecystectomy. Cholecystographic studies made of 18 patients following cholecystostomy showed lack or impairment of gall-bladder function in 61 per cent. A study of the preoperative history indicated that the patients with the shortest duration of biliary disease obtained the most relief from operation. EARL GARSDIE, M D

Felner, L., Soltz, S F., and Haun, P The Syndrome of Adenoma of the Pancreas *Bull Neurol Inst New York*, 1935, 4 310

The authors report five cases of adenoma of the islands of Langerhans. In all, the diagnosis was confirmed by operation. Four of the patients were women. The ages at the time of onset of the condition ranged from twenty-two to forty-seven years, and the duration of disease up to the time of operation from six months to twelve years.

The clinical picture of adenoma of the islands of Langerhans is a definitely recognizable neuropsychiatric syndrome consisting of (1) disturbances of consciousness, (2) psychic symptoms, (3) superfluous movements, (4) objective neurological clinical signs, and (5) markedly low blood sugar values and dextrose tolerance curves of a plateau type.

The clinical features are attacks of confusion and exhaustion, superfluous movements, and considerable organic mental reaction with fear, irritability, restlessness, variations in the threshold of awareness, changes in behavior, and some degree of amnesia for the entire episode. The mental manifestations are of the toxic type, paroxysmal and transitory, and associated with other definite symptoms including profuse diaphoresis, weakness, dizziness, and occasional transitory aphasia or paraphasia, diplopia, and headache. Between attacks, evidences of mental deterioration may sometimes be noted. The superfluous movements vary from convulsive to tic like, semi purposeful, and aimless or bizarre manifestations accompanied by clouding of consciousness varying from dreamy states to attacks of unconsciousness.

In the five reported cases the objective neurological signs were as follows: diplopia in three, nystagmus in three, slight obscuration or blurring of the optic papilla in four, inequality of the deep reflexes in three, Babinski and Chaddock signs in two, convulsions of other definitely superfluous movements in four, and transitory aphasia in three. Clouding of consciousness occurred in five of the

cases and in three it amounted to attacks of unconsciousness.

The symptoms present paroxysmal exacerbations which are characteristically relieved by the intravenous administration of dextrose. In all of the authors' cases the level of the fasting blood sugar showed a marked reduction and dextrose tolerance tests revealed a curve of the plateau type with a delayed fall. It is to be emphasized that the fasting blood sugar value is not always markedly low. Certain variations may be anticipated and are consistent with the diagnosis of adenoma of the pancreas. A slight to moderate degree of temporary relief following special diets and extra feedings may be noted and more specifically a marked temporary improvement following intravenous injections of dextrose. Despite such palliative therapeutic measures the course of the disease continues to be progressive and presents recurrent typical paroxysmal manifestations.

The typical clinical signs are dependent on pathological involvement of the brain. A hypoglycemic state resulting from hyperinsulinism appears obvi-

ous, but the exact mechanism responsible for the alteration in brain function and structure remains to be established. In the absence of a gross defect of the liver, no other endocrine disease with the possible exception of severe involvement of the adrenal glands is likely to cause difficulty in the differential diagnosis.

Because of the almost exclusively neuropsychiatric manifestations, patients presenting the symptoms characteristic of pancreatic adenoma are very likely to be admitted to neurological and psychiatric hospitals and clinics.

In all of the five cases reported by the authors removal of the tumor was followed by recovery. In four cases a single tumor was found. The neoplasms were well encapsulated, very vascular and from 1 to almost 2 cm in diameter. Their locations varied and bore no relationship to the symptoms. The variation in position, small size, and occasional multiplicity of such neoplasms show the necessity for careful examination by both inspection and palpation of the entire pancreas at the time of operation.

ARTHUR S. W. TOLKOFF, M.D.

GYNECOLOGY

UTERUS

Phaneuf, L. E. The Place of Colpectomy in the Treatment of Uterine and Vaginal Prolapse
Am J Obst & Gynec, 1935, 30 544

CORRECTION

In the first line of the second paragraph of the abstract of this article on Page 143 of the February, 1936, issue of the INTERNATIONAL ABSTRACT OF SURGERY there was a typographical error. This line should read

"Inversion of the vagina following supracervical or total hysterectomy may be easily cured by colpectomy."

McFarland, J. Malignant Myoma. *Am J Cancer*, 1935, 25 530

The author studied fifty three cases of malignant tumors of unstriated muscular tissue from various regions of the body. In only thirteen was the diagnosis of malignant tumor proved by the discovery of recurrence or metastases at autopsy. In thirty four, the diagnosis was based entirely on the microscopic appearance of the tumor. As the incidence of malignancy in leiomyomas of the uterus is reported by pathologists at from zero to 10 per cent, it is apparent that opinions differ as to what constitutes malignancy and the accuracy of the diagnosis in these thirty four cases is rendered doubtful.

McFarland agrees with Cohnheim that uterine leiomyomas arise from residual embryonal cellular material. He discusses the evidence for this theory and the confusion in nomenclature. His studies have led him to conclude that the only proof of malignancy is the occurrence of metastasis.

CHESTER C. GUY, M.D.

Healy, W. P. Experience with Multiple Dose Röntgen Therapy in Malignant Diseases of the Uterus and Ovaries. *Am J Obst & Gynec*, 1935, 30 613

The author's experience with multiple dose X ray therapy for carcinoma of the cervix during the past two and a half years has been encouraging. He states, however, that a satisfactory technique of X ray dosage and treatment factors remains to be developed. Although he is now giving 300 r daily to two opposite fields, he is not sure that this is the optimum dose and he has not determined the optimum rate of administration. The multiple divided dose method of X ray therapy cannot be used to advantage for all cases of cervical malignancy. The cases must be chosen with care. Healy believes that by careful selection of the cases many of the patients who now die in the third and fourth

year under current methods of irradiation therapy might be cured. He does not use the method in cases of hopelessly advanced cancer as the mental and financial strain are too great when compared with the brief prolongation of life.

Patients with a heavy pendulous abdomen or who are generally obese are not good subjects for roentgen irradiation. In the cases of such patients the irradiation is apt to result in much damage to the skin and subcutaneous fat leading to localized areas of brown induration with overlying telangiectases. Such areas are easily injured, and their injury may result in chronic ulceration extremely difficult to heal.

Experience with deep X ray therapy in multiple doses in the treatment of ovarian tumors indicates that such intraperitoneal metastases or implants are much more irradiation sensitive than intraperitoneal metastases from uterine tumors.

EDWARD L. CORNELL, M.D.

Jeanneney and Authie. Fatal Accidents in the Radium Therapy of Uterine Cancers. (Les accidents mortels de la curiethérapie des cancers utérins). *Rev. franç. de gynéc. et d'obst.*, 1935, 30 677

Although in the treatment of uterine cancer radium irradiation is gradually displacing the radical Wertheim operation with its high primary mortality (8 per cent) even in favorable cases, radium therapy also has a primary mortality. The latter is estimated at 3 per cent by Laborde and at 1.5 per cent by Begoun and the authors of this article.

Many theories have been advanced to account for deaths occurring soon after radium irradiation, but none of them satisfactorily explains all cases. The authors present a brief analysis of these theories.

The infectious theory is based on the fact that ulcerating carcinomatous lesions contain many organisms. Although radium is said to have a sterilizing effect upon these lesions, it cannot be denied that in some instances the virulence of the organisms is often increased rather than diminished by irradiation. The increase may be due to the rays themselves or to the trauma or stasis resulting from the introduction of the radium container. Under such conditions the clinical picture preceding death is that of pelvic peritonitis with general intoxication.

Cardiovascular symptoms (dyspnea, cyanosis) following radium irradiation, particularly in massive doses, would seem to indicate that radium has an unfavorable effect on the cardiovascular apparatus. While in most instances these symptoms are transitory, in some cases they lead to death. Their cause has been believed to be an acute toxic myocarditis. The myocarditis has been ascribed to the disintegration of tissue proteins (normal tissue, neoplastic tis-

sue and destroyed leucocytes and erythrocytes) By some, such deaths are attributed to shock due to liberation into the blood stream of the products of disintegrating cancer cells (protein shock).

Among other factors held responsible for death are embolism hypoglycemia (hyperinsulinism) hypervagotonia (from parasympathetic stimulation), and endocrine imbalance. The authors are of the opinion that these factors rarely operate separately but are closely associated and occur simultaneously.

To guard against these complications, whatever their cause, the authors advise careful examination of patients before irradiation is attempted. They state that infections should be combated by antiseptic irrigations or excision of the infected portions with the electrocautery. For cases of streptococcus infection autogenous vaccines have been advocated. If the temperature rises during the irradiation the treatment should be discontinued at once.

Cardiovascular accidents are guarded against by the administration of cardiac tonics (strophanthus digitalis). Patients showing endocrine disturbances are given adrenalin. Isotonic saline solution given by hypodermoclysis and hypertonic saline solution given intravenously are of distinct benefit in these conditions.

In the cases of patients predisposed to hypoglycemia a high carbohydrate diet is indicated. If necessary, this may be supplemented by the intravenous administration of glucose.

While radium therapy carries a risk of death from various causes as yet not clearly understood the authors insist that these factors are present also in surgical treatment and should not be charged specifically to radium. HAROLD C. MACE, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Pugliatti: Nodose Tubal Lesions Bilateral Ampullary Adenomyoma of the Endometroid Type Associated with Calcified Fibrous Tuberculous Salpingitis. (A proposito delle formazioni nodose tubariche Adenomyoma ampollare bilaterale a tipo endometrioide associato a salpingite tubercolare fibrosa calcifica) *Arch. di ostet. e ginec.* 1935, 42, 651.

The patient whose case is reported, a woman forty-eight years of age, died so soon after her admission to the hospital that her clinical history could not be obtained.

Autopsy showed the cause of death to have been cerebral hemorrhage. It disclosed also old sclerotic and caseous tuberculous of the apices of the lungs and hilar nodes and in the ampullary portion of both fallopian tubes which were deformed by an old pelviperitoneal inflammatory process and were the site of fibrocalcified tuberculosis, a small hard well circumscribed nodule whose histological examination showed to be an adenomyoma.

From a review of the literature and his own studies the author concludes that in the majority of the cases of nodose tubal lesions, especially those which

are intramural or isthmic, the lesions are inflammatory and assume an endometrioid appearance through metaplasia of their epithelial components. For this type he prefers the term "salpingitis nodosa."

More obscure are true new growths in which there is the possibility of a dysembryoplastic (wolffian or muellerian), post fetal neoplastic, or migratory origin, especially when they have an appearance similar to that of uterine mucosa. For these lesions the author prefers the term "adenomyosis" or "adenomyoma."

To describe the histological picture more accurately, he advises qualifying the term "salpingitis nodosa" by the phrase "of the endosalpingoid type" or "of the endometrioid type," depending on whether the epithelial component of the lesion resembles more the epithelium of the tube or that of the uterus.

He concludes that the condition in the case he reports was one of malformation of the muellerian duct. FREDERICK T. LEECH, M.D.

Meigs, J. I. Ovarian Tumors with Endocrine Significance. *Ann. Surg.* 1935, 101, 814.

Meigs states that the increased interest in ovarian tumors is due to the emphasis on hormonology and that, for the most part, our knowledge is due directly to the researches and writings of Meyer of Berlin who clarified the embryology, pathology, and physiology of the arthenoblastomas, the dysgerminomas, the granulosa cell tumors, and others. As Meyer's observations led to a search of all old microscopic slides in the great pathological laboratories many unusual and interesting ovarian tumors will probably be reported in the next few years. Such a search has been made by Meigs in the Pathological Laboratory of the Massachusetts General Hospital. Meigs gives a brief review of the histones and physical and pathological findings in five cases of dysgerminomas and seven cases of granulosa-cell tumors. He presents also a brief description of the interesting characteristics of the now known group of physiological neoplasms of the ovary.

ALFRED M. VOLLMER, M.D.

Adams, L., and Stanculescu, V. The Problem of Malignant Tumors of the Ovary (Zur Frage der malignen Tumoren des Ovariums). *Rev. chir. med.* 1934, 23, 1579.

Twenty per cent of benign ovarian tumors degenerate into malignant tumors. The authors report on the following ovarian neoplasms which they examined macroscopically and microscopically: (1) a Pflueger epithelioma with tubules of minute cells resembling germinal epithelial cells; (2) a Kruckenberg tumor; (3) a malignant follicular tumor with general metastases; (4) a degenerated pseudocarcinomatous cystoma; (5) a dermoid cystoma with malignant myxomatous degeneration; (6) an atypical cysto-epithelioma of wolffian origin; (7) an intra-cystic vegetating epithelioma; (8) a teratoma with

malignant degeneration of the malpighian cell layer, (9) generalized metastases formed three years after the removal of an ovarian teratoma (10) a teratoma with malignant degeneration arising from the sweat glands, (11) two malignant papillary cystomas, (12) an ovarian seminoma, and (13) a cystopapillary epithelioma

In classifying these neoplasms the authors followed the classification of Roussy, Oberling, and Leroux, according to which, malignant ovarian tumors are of the following types and subtypes

- 1 Cysto papillary epithelioma
- 2 Vegetating epithelioma
- 3 Solid epithelioma (a) glandiform epithelioma, (b) Pfeuffer epithelioma, (c) follicular epithelioma, and (d) ovarian seminoma

In conclusion the authors emphasize the importance of microscopic examination of excised ovarian tumors which are apparently benign, and of careful determination of the site of origin of the tumor in cases of secondary carcinoma of the ovaries

(BICKEL) MATTHIAS J SEIFFERT, M D

EXTERNAL GENITALIA

Joachimovits R. The Pathology and Therapy of Vaginal Discharges (Beobachtungen zur Pathologie und Therapie des Fluor vaginalis) *Wien klin Wochenschr*, 1935, 1: 759

The author presents first a review of the known factors which govern the acid titer of the vagina, especially, the metabolism of glycogen in the vaginal wall and vaginal contents. On disappearance of the acidifiers, when entering bacilli no longer encounter the high acid milieu of the acidophiles, progressive invasion by other bacteria occurs. If the nutrient medium of the vaginal bacilli is again improved by endogenous factors, self purification of the vagina and disappearance of the invading bacteria take place. In this process an important rôle is played by the peculiarly formed capillary and venous vessels of the vagina

The occurrence of a vaginal discharge is often due principally to hypofunction of the ovary with disturbance of the normal regulation of the character of secretion. Diseases of the urethra or the vestibule, but above all of the cervix with neutralization processes are frequently the primary basis for the development of a bacillary discharge. Classification according to degree of vaginal cleanliness as suggested by Maunul Heurlin may lead to error as the so called first degree of cleanliness is frequently only seemingly such. Cultural studies frequently demonstrate pseudo-diphtheria bacilli in considerable numbers. According to the author's experience, these bacilli together with the bacillus vaginalis, are present in the vagina in about 20 per cent of cases. Large numbers of leucocytes indicate that cleanliness is only apparently of the first degree. The staining of smears by Dold's method in addition to the necessary Gram staining may be of aid in identification to the practitioner who has no nutrient media

available. The presence of the comma variable which is not infrequently found in pure culture, is always to be considered an indication of diminished ovarian activity. Culturing of this organism, which must not be considered a modified form of the bacillus acidophilus of the vagina, is difficult, the author succeeded in only four cases and then on 2 per cent dextrose blood agar

The normal adult vagina is not favorable to the invasion of the gonococcus. In the vaginas of children and pregnant women, climacteric, senile, and inflamed vaginas and the normal vaginas of adults in which the epithelium has been loosened by cervicitis, gonococcal invasion may occur. However, an exact, and possibly cultural, differential diagnosis is necessary

A clinical characteristic of vaginal discharges due to yeasts and actinomyces (formerly known as streptothrix) is the sudden re appearance for a short time of a copious thick, discharge after an interval of several weeks during which it had apparently dried up. When only the leptothrix is found in the smear the author uses local treatment only in the initial stage but usually supplements it with general therapeutic measures for strengthening, such as, hormone injections, the administration of calcium, and urine baths

The trichomonas vaginalis of Donne may occasionally become pathogenic. According to the length of survival of the flagellates as demonstrated by cultural studies, proof of the cure of trichomonas vaginalis requires at least four months

In the treatment, determination of the hydrogen ion concentration of the vaginal contents is just as important as examination of the vaginal smear. It is best to use the Fohen colorimeter with the pH scale of Nyberg

Involvement of the vaginal wall may also occur in vaginitis in the form of a granular inflammatory colpitis which may be differentiated clinically from the endocrine type of this disease described by Kermanner. The author reports a unique case, that of a Javanese girl who had a dense collection of lymphoid tissue composed of lymph nodes with germinal centers in the vaginal mucosa. He found only one other such case recorded in the literature

On the basis of histological studies, the author states that with the introduction of dextrose and lactose, especially in conjunction with tannin, a glycogen deposit can be produced in the vaginal wall. However, before or simultaneously with the biological therapy the bacteria accumulated in the vaginal epithelium, sub epithelium, and deep tissues must be destroyed. Many silver preparations and the caustic douches of Menge have the disadvantage that they coagulate albumin or form silver sulphide. The author considers omniscient to be a good remedy for the various types of discharge and erosions. This is a powder of very fine particles which is insoluble in water and consists of a combination of metallic silver with substances altering permeability. It gives off active oxygen vigorously. For the frequent

very resistant cervical discharge the author recommends ethereal oils (particularly cineol carraigheen emulsion), which do not injure the tissues and possess great penetrative powers. In addition to high disinfecting powers, the ethereal oils have the advantage that they diffuse through the cervical mucus and therefore suffer no diminution of their effectiveness.

In cases with disturbances of the sympathetic nervous system it is often necessary to give calcium by mouth and carbonic acid plunge baths after the cure of a discharge due to inflammation.

Resistant ulcers of the vagina may sometimes be cured with large doses of ovarian hormone (progestin) (STRAKOSCH) JACOB F. KLEIN M.D.

MISCELLANEOUS

Westman A. The Hormonal Treatment of Menstrual Disturbances and Its Theoretical Bases (Die hormonale Therapie der Menstruationsstörungen und ihre theoretischen Grundlagen) *Acta obst et gynec Scand* 1935 15 233

This is an anatomical and physiological discussion of the sexual cycle and the regulating influence of these hormones. The author takes up (1) the influence on the menstrual cycle of general medical disturbances (2) constitutional factors (3) the nervous system and (4) the various endocrine organs. He discusses functional disturbances of the ovaries and pituitary gland and their diagnosis with the aid of determinations of folliculin and prolactin in the urine.

He then reports the results of experiments carried out to determine the influence of folliculin, corpus luteum hormone and prolactin on the ovary and pituitary gland.

With regard to the administration of sex hormone preparations he states that in the Upsala Clinic the following preparations have been used: over (a folliculin preparation) luteal (a preparation of the corpus luteum hormone) and prolactin.

Of three cases of primary amenorrhea a favorable result was obtained by treatment with prolactin and folliculin in two.

Of seventeen cases of secondary amenorrhea, three were treated only with prolactin. In these no result was obtained. Of four cases treated with small

doses of ovex given by mouth, a positive result was obtained in one and a negative result in three. Of four cases treated with large doses of ovex given by injection a positive result was obtained in three and a negative result in one. Of five cases treated with prolactin and ovex, a positive result was obtained in two and a negative result in three. The best results were obtained with large doses of folliculin.

Of three cases of juvenile hemorrhage which were treated with large doses of prolactin to provoke luteinization of the ovary, considerable improvement resulted in one and a favorable result was obtained in the two others.

Of ten cases of climacteric hemorrhage eight were treated with luteal. In three of these a favorable result was obtained. The two other cases, those of women who were comparatively young, were treated with prolactin. A favorable result was obtained in one.

A number of cases of climacteric disturbances were treated by the oral administration of ovex with a favorable result.

Titus P. Sterility: Causes and Treatment *J Am Med Ass*, 1935 105 1237

Titus outlines the essential details of the routine study of a case of relative sterility and reports the results of an analysis of 113 cases. Of 83 cases in which proper treatment was given, pregnancy occurred in 33 (40 per cent of 67 cases in which complete study and treatment were carried out). In addition, pregnancy occurred in 5 cases which were studied incompletely.

As sterility is usually due to a multiplicity of factors, a systematic routine of investigation is necessary. This must include both the wife and husband. The authors found that in their series of cases mechanical faults predominated. Obscure endocrine disturbances are less common.

Absolute sterility in the female due to salpingitis or perisalpingitis may often be corrected by a plastic operation. Absolute sterility in the male due to such causes as gonorrheal stricture of the urethra or occlusion of the epididymis can usually be corrected by a comparatively simple plastic operation.

Of 25 cases of absolute sterility reviewed by the author, pregnancy resulted in 22 per cent.

HARRY W. FINN M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Well, A. M. Triplet Pregnancy (*Grossesse tringémelle*) *Gynec et obst* 1935, 32 289

This article is based on eight cases of triplet pregnancy observed at the Tarnier Clinic in the period from 1926 to 1933. During this period the ratio of triplet pregnancies to single pregnancies was 1:3,318. This represents a decidedly higher incidence than has been reported heretofore.

Four of the eight triple pregnancies reviewed were bivitellic, three were trivitelline, and one was univitelline. This agrees substantially with the finding of others that univitelline varieties are in the minority. Five of the eight women gave birth to infants of the same sex—three to only females and two to only males. The three others were delivered, respectively, of one female and two males, two females and one male, and two females and a fetus paperyaceous. In the preponderance of females these cases differed from cases reported by others in which there was a larger proportion of males. There were no triple placentas, four of the placentas being single and four double. There was some variation in the size and color of the placental masses. The size generally varied with the age of the pregnancy. Each fetus had its own umbilical cord and amniotic sac. In one bivitellic pregnancy the double ovum was mono amniotic.

The age and parity of the mother and maternal syphilis were of little importance. The majority of the mothers were primiparae or secundiparae. With two exceptions, they were under thirty years of age. Multiple pregnancies were unknown in the direct or collateral ancestry. None of the mothers had had a previous multiple pregnancy. Only one had had previous antisyphilitic therapy. None was frankly syphilitic.

The pregnancies ran a normal course for the most part. In two instances acute bydramnios necessitated early interruption. In the others, delivery occurred at or near term and spontaneously except in one case in which the use of forceps was necessitated by uterine inertia accompanied by hemorrhage. Cephalic presentation was most frequent and breech presentation nearly as frequent. The puerperium was normal in the majority of the cases. The diagnosis of triplet pregnancy and fetal presentation was facilitated by X-ray examination.

The prognosis of triplet pregnancy for both mother and babies is much better than is generally believed. However, one mother died of shock a few hours after delivery, and three of the nineteen viable children succumbed after birth.

The management of the pregnancy and labor does not differ greatly from that of single or twin preg-

nancies. Bed rest is essential during the final months. During labor, conservatism is desirable except for the indications of maternal or fetal distress. Too rapid delivery should be prevented because of the danger of collapse from rapid decompression. To prevent such collapse, the author advises compressing the abdomen during, and for some time after, delivery. The chief danger during and immediately after delivery is hemorrhage from the uterine atony which follows prolonged distention of the uterus.

HAROLD C. MACK, M.D.

Meylan, R., and Mossadegh, R. The Diagnosis of Ectopic Pregnancy (*A propos du diagnostic des grossesses ectopiques*) *Gynec et obst* 1935, 32 321

Ectopic pregnancy is apparently becoming more frequent, but in spite of present day increased experience with the condition, diagnostic difficulties are still as great as ever, at least in the early stages. According to Labhardt, 18 per cent of cases hospitalized in Basel during the past quarter century were diagnosed incorrectly. In order to determine, if possible, what can be done to increase the accuracy of diagnosis, the authors studied signs, symptoms, and laboratory tests which may be of aid to the clinician in the early stages of the condition when the difficulty of diagnosis is greatest. The classical picture of tubal rupture or abortion with intra-abdominal hemorrhage usually presents no difficulties.

This study is based on an analysis of 130 cases operated upon at the Geneva Maternity Hospital during the years from 1929 to 1934. 82 of tubal rupture and 48 of tubal abortion. The right tube was involved in 67 and the left tube in 63. The total mortality was 8.4 per cent, of which 3.8 per cent was attributed to the operation.

The symptoms presented in these cases were the following:

1. Anomalies of menstruation. These occurred in 93.7 per cent of the cases. In 89.7 per cent there was metrorrhagia.

2. Cul de sac tenderness. Tenderness in the cul de sac was found in 81.8 per cent of the cases. It was often the only sign which could be discovered on examination. The pain due to the presence of blood in the pouch of Douglas is more intense than that elicited by palpation of the affected tube. This fact serves to differentiate ectopic pregnancy from adenitis. In appendicitis, cul de sac tenderness is limited to the right side. Ectopic pregnancy is characterized also by absence of the fever and marked abdominal muscle spasm which are usually present in other pelvic and abdominal inflammations.

3. Juxta uterine tumor. A juxta uterine tumor was present in 77.7 per cent of the cases. Such a

tumor is often difficult to distinguish because of pain in the cul de sac. The tumor is soft and relatively non sensitive. It is situated to either side of a soft, enlarged fundus which does not correspond to the size expected for the same stage of normal pregnancy.

4 Signs of anemia. Signs of anemia were present in 59.8 per cent of the cases. Massive internal hemorrhage and associated peritoneal shock produce a picture of acute anemia not easily overlooked. Minor blood losses in ectopic pregnancy cause less definite signs of anemia (lowering of the blood pressure, vertigo, tachycardia, and occasionally bradycardia) which are equally important.

5 Shoulder pain (sign of Laffont). This sign was present in 45.6 per cent of the cases. It is due to phrenic nerve irritation by blood collecting beneath the diaphragm. It may be felt in the arm, shoulder or neck. In 48 of the cases reviewed it was present on the same side as the abdominal pain or in both shoulders. It occurs most often on the right side.

6 Rectal pain. Rectal pain was present in 32 of the reviewed cases. It is an infrequent symptom resulting from peritoneal irritation by blood or pus. It is felt most frequently after defecation and is associated with a sense of weight and a desire to defecate.

7 Bladder symptoms. Twenty eight of the patients had urinary symptoms which were more or less severe. These relatively infrequent symptoms are due to peritoneal irritation. The most common is dysuria.

Other clinical signs such as blue discoloration of the umbilicus, pain on manipulation of the uterus, and vascular pulsations at the inferior pole of the adnexal tumor are dismissed by the authors as being of little diagnostic aid. Cul de sac puncture is a simple and valuable procedure but is not without danger as it may re activate arrested hemorrhage.

Among the most important laboratory procedures which are helpful in the diagnosis of ectopic pregnancy the authors emphasize the Aschheim Zondek reaction. However they state that this test requires careful clinical interpretation. A positive reaction may be due to an intra uterine pregnancy and a negative reaction does not exclude the possibility of an ectopic pregnancy with a dead ovum.

The blood sedimentation rate is generally accelerated (ranging from normal to forty five minutes). The leucocyte count increases in proportion to the amount of blood lost. The temperature usually remains normal or only slightly elevated except when secondary infection supervenes.

HAROLD C. MACK, M.D.

Ahlborn G. Disturbances Experienced by Pregnant Women When in the Dorsal Position (Ueber Rückenlagebeschwerden bei Gravidem). *Acta obst et gynec Scand*, 1935, 15, 295.

In the case of a previously healthy woman in the latter half of her first pregnancy a marked increase in the pulse rate, a considerable reduction of the

blood pressure and pulse tension and retardation of respiration occurred when the patient lay on her back. Roentgen examination revealed reduction of the heart volume. The woman complained of discomfort and tension in the upper part of the abdomen and difficulty in breathing. A series of examinations demonstrated that these phenomena appeared only when the pregnant uterus rested against the right posterior part of the peritoneum.

An investigation of the effect of pregnancy on the circulatory apparatus showed that during particularly the last part of pregnancy there is an increased disposition to the development of circulatory disturbances. In experiments on animals reported in the literature compression of the inferior vena cava was found to cause a reduction of the blood pressure and an increase in the pulse rate.

The symptoms in the case reported in this article and also in a case reported previously may be explained by compression of the vena cava by the pregnant uterus with possible simultaneous upward displacement of the diaphragm.

The author investigated the symptoms commonly present in the dorsal position and the spontaneous changes in the sleeping position during the latter half of pregnancy. Of 653 women 197 (30 per cent) stated that they noted tenderness, fatigue or pains in the abdomen or back, stronger movements of the fetus, and palpitation when lying on the back. Forty two (6.4 per cent) were unable to lie on the back. In the cases of more than one third the sleeping position was changed in the latter part of pregnancy.

In practically all of another series of 180 pregnant women the symptoms disappeared completely with parturition.

There is consequently a striking parallelism between these fairly common feelings of discomfort and the grave symptoms exhibited by the author's patient. Ahlborn concludes that the common symptoms experienced by pregnant women when reclining on the back are probably caused by more or less complete compression of the vena cava by the pregnant uterus possibly in association with upward pressure on the diaphragm.

Hendley J. M., Walton H. J., Hibbitts J. T., Siegel I. A., and Brack C. B. Physiological Changes Occurring in the Urinary Tract During Pregnancy. *Am J Obst & Gynec*, 1935, 30, 625.

The most constant changes in the urinary system during pregnancy are dilatation of the pelvis and calyces of one or both kidneys, dilatation tortuosity and kinking of one or both ureters, and lateral displacement of these structures. The right kidney and ureter are affected more often than the left but the left ureter is displaced laterally more frequently than the right. In roentgenograms studied by the authors the portion of the ureter which runs over the pelvic wall was not visualized whereas the pelvic ureter was often well outlined. Following pregnancy there is a return of the urinary system to normal.

Of twenty six women examined after delivery, eighteen showed a return to normal in twenty-eight days. One required fifty six days.

In the cases of thirteen women, all except two of whom died at term, the authors studied the urinary tract histologically. In all but one case some dilatation of the ureter was found. The right ureter was constantly more dilated than the left. Gross examination showed that the dilatation always began above the brim of the pelvis. The lower end of the pelvic ureter was quite firm and rigid, whereas the abdominal spindle was always flaccid and ribbon like and showed a definite loss of tone. No evidence of stricture formation was demonstrated on either macroscopic or microscopic examination. Hypertrophy of the musculature, edema, and increased vascularity in the urinary tract were constant findings. The most striking change in the urinary system was the marked hypertrophy of the ureteral sheath of Waldeyer.

The cause of ureteral dilation is two fold. The primary changes in the ureter are hormonal in action, and the pressure of the uterus causes a constriction at the pelvic brim.

The authors have found that definite regression of dilatation of the renal pelvis and the ureter occurring during pregnancy is brought about by the use of an indwelling catheter. The continuous drainage must be maintained for at least forty eight hours before a decrease in capacity is noted. Even with continuous drainage, the decrease in the dilatation cannot be expected to be very rapid as the ureter is still atonic and soft because of the continuous action of estrin.

FORWARD L. CORNELL, M.D.

Thomas, W. A., Allen, E. D., Bauer, C. P., and Freeland, M. R. The Toxemias of Late Pregnancy. *Am J Obst & Gynec*, 1935, 30: 665.

All patients, including private patients and patients in the prenatal clinics, who exhibited any deviation from normal such as hypertension, albuminuria, headache, visual disturbances, or edema, were hospitalized and subjected to intensive study, the studies being repeated as frequently as the condition warranted.

This investigation demonstrated that no test or group of tests accurately represents the complete picture of toxemia of pregnancy, and that clinical experience and judgment must not be relegated to a position secondary to an arbitrary set of standards.

After completion of the tests the authors' patients are put on a salt free diet. During pregnancy there is an invisible edema which is aggravated by the sodium ion. From 2 to 3 gm of potassium chloride are given daily on the tray to be used as salt. In many instances this definitely decreases the edema. If there is an excessive loss of protein in the urine additional protein is given. Fluids are given freely, even in the presence of edema.

Magnesium sulphate in 10 per cent solution administered intravenously is very effective in reducing a high blood pressure. Glucose in 6 to 10 per cent

solution given intravenously or by multiple needles subcutaneously is of value in hypoglycemia and anuria. Hypertonic glucose is valuable in edema of the brain accompanying convulsions in eclampsia. Calcium lactate by mouth and calcium gluconate or levulinate given intravenously protect against liver damage and, by replacing sodium from tissues, promote diuresis. Venesection should be avoided.

Shock, one of the manifestations of toxemia occurring usually just after delivery, but occasionally before delivery, is due to rapid loss of blood volume, not from hemorrhage, but from removal of free blood water by the tissues. The primary need is a fluid that will remain in the circulation. Salt and glucose are lost almost as rapidly as they are given. Transfused blood and acacia solution are the two fluids which meet the requirements. The improvement occurring during the administration of acacia solution is frequently very striking.

EDWARD L. CORNWELL, M.D.

Baird, D. The Upper Urinary Tract in Pregnancy and the Puerperium, with Special Reference to Pyelitis of Pregnancy. *J Obst & Gynec Brit Emp*, 1935, 42: 577.

The ureter in its lumbar and iliac portions lies in contact with the aponeurosis of the psoas muscle about one fingerbreadth from the spine. In front it is in intimate contact with the posterior peritoneum. It has a wide range of mobility in its abdominal portion, a fact to be borne in mind when considering the changes occurring in pregnancy.

At the pelvic brim the ureters cross the iliac vessels obliquely where the common iliac artery divides into the internal and external divisions. At this point there is a difference in the two sides due to the difference in the course of the common iliac vessels. The right common iliac vessels cross the vertebral column from left to right and therefore lie more anteriorly than the left. As the right ureter must cross over the right common iliac vessels almost at a right angle to gain the pelvis it has a more exposed course than the left, which is partly protected by the promontory of the sacrum, and the sigmoid colon and its mesentery which lie anterior to it.

As early as 1869 Engelmann described in detail the nature of peristaltic contraction in the ureter. He observed that the contractions normally originate in the renal pelvis and proceed toward the bladder, that the contractions are independent of intrinsic or extrinsic nerves, and that the impulse to contract is conveyed directly from one muscle fiber to another. Later workers have found that the greater the pressure of fluid passing through the lumen of the ureter the more frequent and vigorous the peristaltic waves become. A practical application of this finding is the treatment of stasis and infection in the urinary tract with abundant fluids. There has also been brought forward evidence that the salt content of the urine will cause local reflex stimulation of the ureteral musculature and that stimulation of the splanchnic nerve will cause in

creased ureteral peristalsis whereas section of this nerve will inhibit peristalsis.

Working with dogs Barksdale (1930) found that reflux along the ureters from the bladder is more common during pregnancy than in the non pregnant state.

Wislocki and O'Connor (1920) studied the effect of partial and complete obstruction of the ureter in animals. After partial ligation the lumen increases in diameter and the muscle hypertrophies above the obstruction. Peristaltic waves are more frequent and more vigorous than in the normal ureter. The ureter below the obstruction exhibits normal spontaneous peristaltic contractions. In complete obstruction there is seldom any spontaneous peristalsis and the ureter does not react to stimuli. However when part of the contained fluid is released violent peristaltic and antiperistaltic movements begin.

The results of partial obstruction in the ureters of dogs described by Smith and Ockerblad are of the greatest importance as the deformities produced in the ureter are similar to those occurring in the right ureter in women in the second half of pregnancy. This is strong evidence in favor of the view that partial obstruction to outflow occurs in the human ureter at the level of the pelvic brim in the second half of pregnancy. In pregnant women no hypertrophy of the ureteral musculature occurs above the point of obstruction suggesting that some other factor prevents this physiological response to obstruction. This explains why such marked degrees of dilatation occur so quickly as the result of the relatively moderate pressure which can be exerted by the pregnant uterus.

According to Jona (1931) Herbst (1931) and Gruber (1930) pituitrin causes contraction of the renal pelvis and ureter. According to Gruber the lower third is much more affected than the rest. These authors state that eserine causes a similar contraction of the pelvis and ureter. Adrenalin causes contraction of the renal pelvis long after the blood pressure has reached its maximum. Herbst states that morphia also stimulates ureteral contractions. Atropine causes relaxation.

The investigation of the urinary tract in gynecological conditions has been undertaken to compare the effect on the urinary tract of the presence of the gravid uterus in pregnant women with that of gynecological tumors of similar size in non pregnant women. It is common knowledge that gynecological tumors both inflammatory and neoplastic are frequently associated with urinary symptoms usually disturbances of micturition due to displacement of or pressure on the bladder but it is not generally recognized that dilatation of the upper urinary tract may also occur in those cases. However it is well known that in cases of advanced carcinoma of the cervix the ureters may be compressed in the parametrium or at the pelvic brim by the carcinomatous tissue, and complete suppression of urine due to blockage of both ureters is one of the recognized causes of death.

Pelvic cellulitis. Of eleven cases of pelvic cellulitis in which a urological examination was made excretion was not delayed in three of salpingo-oophoritis with very slight cellulitis. In eight cases cellulitis was extensive and there was a delay of excretion which was more marked on the left side in five and more marked on the right side in three.

Ovarian cyst. Only one of the eleven cases of ovarian cyst had no delay in excretion. This was the case of a para-*u* with a moderately sized soft cyst which floated about freely in the abdomen. When the cyst is adherent to the tissues in the neighborhood of the pelvic brim, dilatation and stasis are always found. The most marked example of this was a malignant ovarian cyst of moderate size adherent to the pelvic brim at the left side.

Simple cysts which are not adherent may cause dilatation and stasis in the upper urinary tract. It is possible that a disorder of the endocrine balance lowered the tone of the ureteral musculature so that it was more susceptible to pressure. This is probably what occurs during pregnancy.

In the cases in which the cyst fills the pelvis and reaches to the level of the umbilicus (i.e., approximately the size of a five months pregnancy) the ureter on the side most affected by the cyst can be demonstrated clearly by intravenous pyelography down to the pelvic brim showing that the point of compression is at the pelvic brim. When the cyst is so large as to fill the abdomen completely up to the costal margin the compression is not at a single point but the ureter is flattened against the psoas muscle for some distance above the pelvic brim. The same thing is found during pregnancy. In the fifth month the ureters are dilated and show clearly down to the level of the pelvic brim. Near full term one of two things will have happened either compression of the ureter for some distance above the pelvic brim or lateral displacement of the ureter so that it escapes the point where it crosses the pelvic brim. The significant resemblance between the effects on the ureter due to the presence of an ovarian cyst and of a pregnant uterus suggest clearly that mechanical pressure is an important factor in the production of the changes occurring in the urinary tract in pregnancy. Lee and Mengert (1914) argue that the dilatation caused by pregnancy disappears too quickly in the puerperium for the cause to be mechanical pressure and conclude that a disturbance of hormones peculiar to pregnancy is the important factor but the author has found that the dilatation of the urinary tract caused by ovarian cysts in the non pregnant disappears very quickly after removal of the cyst. Further after pregnancy the disappearance of the dilatation is often delayed and the finding of Lee and Mengert to the contrary is due to their reliance on intravenous pyelography to demonstrate the contour of the urinary tract. While this method is admirable during pregnancy the lack of obstruction to outflow makes it quite unreliable in the puerperium when recourse to retrograde pyelography is necessary.

When the cyst presses equally on both ureters, the right ureter is more dilated than the left. The preponderance of dilatation of the right urinary tract in pregnancy is probably due to the same cause.

Fibromyoma It has been possible to perform urological examination in only five cases of fibromyoma large enough to be comparable as regards size with the pregnant uterus in the second half of pregnancy. Delay in excretion was not observed in any case and when the abdomen was opened it was seen that there was no direct pressure on the ureters as the firm consistency of the tumor prevented it from fitting closely into the irregularities of the pelvic brim. This is additional evidence of the obstruction in pregnancy occurring at the pelvic brim.

Baird says that in his survey of twenty eight cases of pelvic cellulitis, ovarian cyst and fibromyoma, he demonstrated conclusively that tumors of sufficient size and soft consistency can compress the ureter and cause dilatation and interference with renal function. If the cyst is situated to one side it causes dilatation of the urinary tract on the same side and less or no dilatation on the other side. When the cyst fills the abdomen uniformly and appears to exert pressure equally on both sides, the right urinary tract is dilated more than the left. This confirms the view that the right urinary tract is more exposed to pressure than the left. As a rule, the dilatation produced in these cases is less than that produced in a pregnancy of corresponding size, and the consequent stasis is very markedly less because the tone of the ureter, as judged by the vigor of the efflux, is not impaired in the non pregnant state to the same extent as in the pregnant state. It has been said in support of the statement that ovarian cysts do not cause dilatation of the urinary tract, that pyelitis is never seen in these cases but as the incidence of clinical pyelitis, even in pregnancy, is only 1 per cent, much larger numbers would have to be studied before definite conclusions could be reached. Moreover, as in the absence of pregnancy the stasis is never so great as in the presence of pregnancy, the liability to infection cannot be so great.

STANLEY C. HALL, M D

Baird D. The Upper Urinary Tract in Pregnancy, with Special Reference to Pyelitis of Pregnancy.
III. Changes in the Upper Urinary Tract in Pregnancy and the Puerperium. *J. Obst. & Gynec. Brit. Emp.* 1935, 42, 733.

Dilatation of the upper urinary tract occurs in nearly every pregnant woman. It is usually more marked on the right side than on the left and affects the calyces, renal pelvis, and ureter down to the level of the pelvic brim, where the ureter narrows suddenly. In its pelvic portion the right ureter is undilated. On the left side the calyces and renal pelvis are less frequently involved. The dilatation affects the ureter usually throughout its whole course, as a rule tapering gradually to the bladder but in some cases narrowing abruptly at the pelvic brim.

On both sides kinks are usually seen, but on the right side they are much more pronounced than on the left side and may be very acute. They are usually situated at the junction of the renal pelvis and ureter and cause definite narrowing of the lumen.

Lateral displacement of both ureters to the outer border of the psoas muscle is frequent in the second half of pregnancy. When this occurs the ureter escapes compression until it crosses the psoas muscle at the level of the pelvic brim to gain access to the pelvis. When no lateral displacement occurs, the ureter lying along the psoas muscle is compressed for the greater part of its course, above the brim of the pelvis. If the abdomen is pendulous—in primigravida because of a contracted pelvis or spinal deformity and in multipara because of a lax abdominal wall—the point of compression is usually low, at the pelvic brim, but when the abdominal muscles are firm and the ureter is not displaced laterally, the ureter is flattened in its abdominal portion to a much higher level. Dilatation of the upper urinary tract is more marked in primigravida than in multipara. Dilatation is found as early as the tenth week and at this stage is uniform throughout both ureters, involving the pelvis as well as the abdominal portions. It may be more marked on the right side even at this early stage. At the end of the fourth month it is increased by the pressure of the pregnant uterus, especially on the right side. Up to the sixth month it increases. From then until term it decreases on the left side. On the right side the calyces, renal pelvis, and ureter down to the pelvic brim may dilate further or may become smaller. More commonly the calyces and renal pelvis increase in size and the size of the ureter diminishes.

In conjunction with dilatation, stasis is usually found, although dilatation can exist without stasis and stasis may be present with very little dilatation. Stasis begins early in pregnancy, reaches its maximum as a rule at the sixth month and diminishes near term. At the sixth month, although there is a marked disturbance of ureteral function, renal function may be better than later when the function of the ureter has improved since, because of the increased pressure of the uterus and the improved tone of the ureter, the intra ureteral pressure rises and affects the function of the kidney adversely.

As the effect on the left kidney is almost negligible symptoms of renal deficiency seldom develop during pregnancy. In 15 per cent of cases pain referable to the urinary tract occurs because of disturbance of ureteral peristalsis.

Histological examination of the wall of the ureter above the point of compression has shown that no hypertrophy occurs in response to the obstruction but, on account of the atony, the ureter simply stretches. Because of the increasing pressure of the uterus, dilatation and stasis would be progressive until the end of pregnancy if some other factor did not come into play. The tone of the ureter improves near term, but diminishes rapidly in the puerperium especially in cases in which the dilatation and

stretching reach a high degree. When the dilatation is only slight during pregnancy the falling off in tone in the puerperium is much less. This suggests very strongly that the improvement in the cases with marked dilatation is due to a stimulus which is suddenly withdrawn after labor. The ureters subsequently regain their tone slowly in proportion to the rate of disappearance of the dilatation. In some cases in which dilatation has been very great, the right urinary tract never returns to normal and the tone remains less than that of the left urinary tract which has been relatively unaffected.

It is now established that estrin sensitizes the uterine muscle to the action of pituitrin and that the estrin content of the blood rises as pregnancy advances, reaches its maximum just before term, and rapidly diminishes in the puerperium. It is possible that the variations in the estrin content of the blood during pregnancy and the puerperium influence the tone of the urinary tract in the same way as they affect the tone of the uterus.

It is claimed that in cases of albuminuric toxemia there is an excess of posterior pituitary hormone in the circulation (Anselmino, Hoffmann and Kennedy). The fact that in this condition there is very little atony of the ureters suggests that the posterior pituitary hormone also plays a part.

ALBERT W. HOLMAN, M.D.

LABOR AND ITS COMPLICATIONS

Bogdanović, M. Hemorrhages During Labor
(Geburtsblutungen). *Rođi. Ginek. i Gynaek. Č. gynaek.* 1935 14 138

The author first reports on hemorrhages associated with miscarriages which were treated at the Gynecological Clinic of Belgrade during the period from 1923 to 1934. In the treatment of hemorrhage with febrile abortion he is conservative, giving active treatment only when the bleeding threatens life. In cases of hemorrhage with afebrile or subfebrile abortion occurring before the third month, active measures were taken only when no tenderness or inflammatory reaction of the surrounding region was present. Of 352 cases in which curettage was done fever without a fatal termination occurred after the operation in only 5. In abortions occurring after the third month the treatment was extremely conservative even in the absence of fever and complications. Of 235 women delivered after the third month, only 5 were febrile during the puerperium and none died. Of 140 women who were admitted to the Clinic with fever 33.3 per cent died.

In 16 cases hydatid mole was the cause of the hemorrhage. Two patients with a destructive mole died of peritonitis. Fourteen patients were normal. In these cases the uterus was emptied with the dull curette only when the hemorrhage threatened life. In 1 case a supravaginal amputation was performed.

In 414 cases internal hemorrhage occurred and ectopic pregnancy was suspected. In 411 cases the suspicion was confirmed. Four hundred and eight

women with ectopic pregnancy were subjected to laparotomy. Three cases of suppuration were treated by posterior colpotomy. In 3 cases there was internal hemorrhage from other causes: corpus luteum hemorrhage, hematoma of the ovary, and hemorrhage from the left uterine horn where a chorionepithelioma had developed. In 20 cases of ectopic pregnancy, blood transfusion was performed. Of 408 patients, 19 (4.6 per cent) died—8 of hemorrhage, 6 of pneumonia and 5 of peritonitis.

Among 7,252 births, hemorrhage occurred 35 times because of placenta previa. The placenta previa was central in 18 cases, marginal in 12, and lateral in 5. In 18 cases Braxton Hicks version was performed, in 12, intra-ovular uterine dilatation, and in 5 cesarean section. Three (8.5 per cent) of the patients died, 2 with central insertion of the placenta died of hemorrhage. One patient who was admitted to the clinic with a high temperature and marginal placenta previa was delivered with forceps and died as the result of sepsis. The child survived.

There were 194 cases of hemorrhage due to retention of the placenta. In 96, the Crede method was used, and in 98 the placenta or the retained membranes were removed by manual extraction. Seven to nine patients were afebrile, 15 were subfebrile, and 4, of which 1 died, were septic. Therefore manual extraction is not so dangerous as was formerly believed, and retention of the most minute placental rest is much more dangerous than this active treatment.

In 3 per cent of the total number of deliveries atonic secondary hemorrhage occurred. The author observed severe hemorrhages following hydramnios and twin births. Uterine tamponade was carried out 8 times. One case ended fatally from heart failure in spite of compression of the aorta and blood transfusion. In all of the other cases massage of the uterus and the intravenous or intramuscular administration of extract of the posterior lobe of the pituitary gland were sufficient.

There were 2 cases of hemorrhage due to inversion of the uterus. In 1, the inversion was reduced and in the other the uterus was amputated. Hemorrhage from wounds of the soft parts of the birth canal occurred in 11.5 per cent of the cases. It was most common after forceps delivery and too rapid extraction of the aftercoming head in breech presentations. In 9 cases the hemorrhage was due to a tear of the cervix and stopped when the tear was sutured. Eight patients with spontaneous rupture of the uterus during labor were treated by supravaginal amputation. Two of them died. One patient with traumatic rupture was treated conservatively as the condition was not diagnosed immediately and recovered (Barjaktarović). Of 5 patients with internal hemorrhage from perforation of the uterus caused by an attempt at criminal abortion only 1 could be saved by hysterectomy. The 4 others, 2 of whom had suffered severe injuries of the intestinal tract, died of peritonitis.

HARRY A. SALZMANN, M.D.
(JANISCH RAČKOVIĆ)

NEWBORN

Kovács, F., and Dapsy, E. The Fate of Premature Infants Following Birth (Über das Schicksal der Frühgeborenen nach der Geburt) *Orvosi hetil.*, 1935, pp. 551, 582

Of the 13,076 infants delivered at the University Obstetrical Clinic of Kovács at Debreczen, Hungary in the period of fourteen years from 1921 to 1934, 1,090 (8.4 per cent) were born prematurely. The definition of premature infants given in the literature varies. The authors, using the Hungarian laws as a basis, have accepted a body weight of from 1,500 to 2,500 gm. and a body length of from 35 to 48 cm. as the criterion of premature birth.

Thirty two and five-tenths per cent of the premature infants were stillborn. Of those born alive, 28.4 per cent died during the first ten days of life in spite of proper clinical nursing and nutrition. Of those discharged from the Clinic in good condition, 10 per cent died at home during the first year of life, apparently because of subsequent insufficient care. By means of questionnaires (which were answered by 242 mothers), the authors found that of the premature infants discharged from the Clinic alive, only 56.5 per cent were still alive after ten years. By means of tabulated and graphically presented detailed statistics they show that, in general, prematurely born children require four years of development to overcome the frailty resulting from premature birth and to attain the resistance of children of similar age who were born at term.

A comparison of the mortality of premature children during the first ten days of life in the hospital (24.3 per cent) and outside of the hospital (84.5 per cent) and of the percentage of premature children born alive in the hospital (38.7 per cent) and in private homes (23.4 per cent) demonstrates that every case of premature birth, even if free from complications, belongs in a hospital.

While the mortality of premature infants during the first ten days of life averaged 36 per cent in the years from 1921 to 1930, it decreased to an average of 20.8 per cent in the years from 1931 to 1934. One reason for the decrease was the fact that in the last few years the care of the newborn at the Clinic is entrusted, not to the midwives, but to specially trained pediatric nurses. Another is that the newborn are kept in a separate nursery where they are protected from droplet infection from visitors. In

the last two years the administration of sex hormones in 164 cases to assure and increase the vitality of premature infants has given good results.

Since infant mortality is considerably influenced by the deaths of premature infants, special attention should be given to the study of the causes of premature births. The authors emphasize the difficulty of deciding subsequently whether an abnormality was the cause of the premature birth or the premature birth was the result of an accidental concurrence of etiologically unrelated complications. In the 1,090 premature births occurring during the fourteen year period reviewed the authors found the following causes:

- 1 Maternal diseases: toxemia of pregnancy (22.0 per cent), lues (12.3 per cent), tuberculosis (3.1 per cent), other infectious diseases (1.5 per cent), circulatory disturbances (1.9 per cent), developmental disturbances of the genitalia (1.2 per cent), generalized debility (0.2 per cent), endocrine disturbances (0.2 per cent), ileus (0.2 per cent), tumors of the genitalia (0.1 per cent).

- 2 Conditions of the fetus and the secundines: twin pregnancy, and hydramnion (6.1 per cent), placenta previa (5.1 per cent), premature separation of the placenta (1.3 per cent), developmental disturbances (0.6 per cent).

- 3 Abnormal position of the fetus: breech position (4.5 per cent), transverse position (1.1 per cent).

- 4 Unrecognized causes (37.4 per cent). In this group the authors have subdivided the traumatic causes. Next to criminal manipulations, they ascribe special importance to the practice of sexual intercourse during the last months of pregnancy. The importance of the latter was evidenced by the fact that in 40 per cent of the cases of premature births the women presented themselves with prematurely ruptured membranes.

The authors could not determine any relationship between the economic condition, social status, or employment of the mother on the one hand and the frequency of premature delivery on the other. Fifty-four and four tenths per cent of the premature infants were legitimate children.

As statistics and experience show that premature infants are capable of eugenically complete later development, special attention should be given to their protection by the provision of special quarters for them in nursing homes.

(STEPHAN SOMMER) HARRY A. SALZMAN, M.D.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Snell A M The Present Status of the Diagnosis and Treatment of Addison's Disease *Med Clin North Am* 1935 19 383

It is now known that Addison's disease presents two characteristic sets of symptoms and signs: those of the stage of chronicity and those of crisis. The principal symptoms of the former are slight asthenia, hypotension, pigmentation of the skin, and occasionally phenomena related to hypoglycemia. They may persist for long periods before the more serious nature of the disease becomes apparent. The more serious symptoms of the disease are those of crisis which are intimately related to the destruction of the cortex of the gland and loss of the cortical hormone. They may develop at any time in latent cases or *pari passu* with the pigmentation and asthenia. Often they appear without warning but more frequently the initial symptoms develop gradually. The most common are anorexia, nausea, vomiting, diarrhea, and circulatory collapse. The development of these symptoms is attended by fairly characteristic chemical changes in the body. The episodes of so-called crisis are attended by loss from the body of sodium with an equivalent loss of chloride and bicarbonate ions and their probable complement of body water. There is usually an associated accumulation of nitrogenous waste in the blood, the blood urea, non-protein nitrogen, and serum sulphates rising rapidly. The serum potassium is also increased often out of proportion to the degree of concentration of the blood. The total base and the carbon dioxide combining power of the blood are reduced, chiefly because of the loss of sodium ions. These findings, which were emphasized first by Loeb and later by Harrop and his collaborators, are of great significance and a thorough appreciation of their importance is essential to adequate treatment.

The diagnosis of the disease, especially during periods of latency, depends almost entirely on the demonstration of pigmentation of the skin. The color of the skin is most frequently a dirty grayish brown. The discoloration is most pronounced on the exposed surfaces of the body. The pigmentation is diffuse but pressure points, scars, and bony prominences are definitely darker than the surrounding areas of skin. Minute black freckles are often noted especially on the neck and shoulders. The genitalia, anus, axilla, nipples, and lips may be strikingly discolored even in the absence of conspicuous general pigmentation. On the oral mucous membranes, especially the buccal surfaces, tongue, and gums are brownish or purplish patches which are very typical. The hands often have a negroid appearance. The palm is distinctly lighter than the dorsum, and a

well marked line of demarcation is noticeable. The lines of the palms may stand out because of the deposits of pigment in these areas. Occasionally the pigmentation may be confused with that of hemochromatosis, acanthosis nigricans, arsenical poisoning, and vagabond's disease. Biopsy of the skin with the use of appropriate stains for iron and arsenic will usually serve to rule out these other conditions.

The demonstration of tuberculosis elsewhere in the body is of considerable importance both from the standpoint of diagnosis and that of treatment. The association of pigmentation of the skin with demonstrable tuberculous lesions anywhere in the body or even with conclusive evidence of a previous tuberculous lesion is of considerable significance in the diagnosis. With the use of the roentgenological technique developed by Camp and his associates it is possible to demonstrate calcification in approximately 25 per cent of cases of Addison's disease. The presence of definite suprarenal calcification is practically pathognomonic of Addison's disease.

By withdrawing salt from the diet of patients who have latent Addison's disease, it usually is possible to produce symptoms of crisis and characteristic changes in the chlorides and nitrogenous components of the blood. In normal individuals with intact suprarenal glands deprivation of salt causes no clinical symptoms and only minor changes in the chemical character of the blood, whereas persons with Addison's disease it usually produces striking changes in the general condition and the chemical components of the blood. This provocative test should never be employed unless the patient is under close observation in a hospital with every facility for emergency treatment at hand as dangerous collapse may be precipitated and extraordinary measures may be required to prevent a fatal termination.

Usually a positive diagnosis of Addison's disease cannot be made with certainty in the absence of typical pigmentation unless it is possible to demonstrate calcification in a suprarenal gland or provoke the clinical and chemical phenomena of crisis by withdrawing salt from the diet.

Also of special importance in the diagnosis is early recognition of the signs of suprarenal insufficiency. Anorexia, nausea, vomiting, and increasing asthenia are among the earlier phenomena associated with this condition and patients who present such symptoms may pass into a state of shock within a few hours. Marked nervous disturbances such as restlessness, delirium, coma, and meningismus may be noted. There is often marked hyperthermia during such episodes. These crises are precipitated by exposure, exertion, catharsis, surgical procedures, or any condition which makes unusual demands on the affected individual. Fortunately, the early stages

of crisis are usually attended by a fall in the concentration of the blood chlorides, a rise in the urea nitrogen of the blood, and the other chemical phenomena of crisis mentioned.

There are, of course, two obvious indications in the treatment of Addison's disease. The first is to maintain an adequate supply of sodium salts, and fluids, and the second, to supply the missing cortical hormone. The importance of an adequate intake of sodium salts in the treatment of Addison's disease can hardly be overestimated. The daily basic requirements are from 6 to 12 gm. The salts can be administered in gelatin capsules or enteric pills or by the use of physiological saline solution as a beverage. Recent studies indicate that sodium salts other than chloride are necessary to maintain suprarenalctomized animals in optimal condition. It has been demonstrated by Allers and by Harrop, Soffer, Nicholson, and Strauss that suprarenalctomized dogs can be maintained indefinitely by diets containing sodium chloride and sodium bicarbonate in adequate amounts without the addition of cortical extract. Clinical data on this point are lacking, but the use of the sodium salts of organic acids in addition to the treatment just mentioned promises to be a valuable procedure. A high salt intake is essential in the latent or chronic case and, of course, in the treatment of the patient who presents symptoms of crisis. It has been noted that patients who are receiving maintenance doses of cortical hormone will have mild symptoms of collapse when salt is withdrawn, and it has been observed that the hormone appears to act in a much more effective manner if an adequate intake of salt is maintained.

The reputation of the cortical hormone has suffered somewhat because of the fact that the available commercial preparations have varied considerably in potency and in some instances have been completely inert. It has been demonstrated that patients with severe suprarenal insufficiency may undergo marked improvement or recovery even when no special attempt has been made to provide salt or fluids. The treatment indicated in the various stages of Addison's disease is difficult to anticipate and must be highly individualized. There are a considerable number of latent cases in which no hormone whatever is needed and the patients get along comfortably on a normal intake of salt. Other patients remain in what Harrop has called "chronic relapse" and require large amounts of the hormone and an increased intake of salt to maintain life. Are there additional hormones which need to be replaced, or do compensatory mechanisms which operate in some cases fail in others? These questions cannot be answered at the present time, but it is entirely probable that the next great advance in the treatment of Addison's disease will be along these lines.

With regard to the dosage of cortical hormone the author says that entirely satisfactory directions are difficult to outline since both the potency of the preparation and the requirements of the patient may vary over a wide range. To date, standardization on the

basis of dog units (cubic centimeters of extract per kilogram of body weight required to maintain the bilaterally adrenalectomized dog) has not been satisfactory, and there is no adequate physiological yardstick which measures the effect on the patient. The amounts of hormone required have been determined largely on a basis of clinical experience, virtually a process of trial and error. In crisis, the requirements are large (from 10 to 20 c cm or more daily). The presence of infection calls for even greater amounts, as has been well demonstrated in the experimental animal. Following syndromes of acute insufficiency it may be necessary to continue with large amounts of hormone for several days before the dose can be reduced with safety. Maintenance dosage can be determined only by gradual reductions in dosage with careful observation of the patient's general condition. A rapid falling off in caloric intake and body weight is a danger signal. Good appetite and a rising weight curve are criteria of adequate treatment. In general, small doses (from 1 to 5 c cm) of the hormone are virtually useless. In most instances the patient needs either 5 c cm or more or no hormone at all. Subcutaneous administration is possible with most preparations, but the intravenous route is necessary in emergencies. No toxic effects have been noted. The failures are attributable to insufficient hormone rather than to overdosage.

The following three important conclusions seem warranted.

1. The morbidity of the disease has been greatly decreased by present day methods of treatment.

2. There is definite evidence that life is being prolonged beyond the figures which were established by Guttman.

3. Atrophy of the suprarenal gland is more evident as a cause of death than before, presumably because of the survival of fragments of cortical tissue in tuberculous lesions which, with some assistance in the form of hormone treatment, may suffice to maintain life.

During the year 1934, not a single patient with Addison's disease died while in Rochester. Two patients died elsewhere because of circumstances under which it was impossible to meet the requirement of emergency treatment with sufficient promptness. A greater number of patients are living and in good condition than at any time in the last ten years. Some of them are actively engaged in earning a livelihood, several at rather strenuous occupations. Some of those in whom the condition is more severe are obviously restricted in their activities. In one case of severe Addison's disease, it has been possible to perform a major surgical operation (nephrectomy). In general, it appears that a hopeful attitude with regard to the treatment of the disease is entirely justifiable. The isolation of the crystalline hormone by Kendall may well lead to the synthesis of this substance in the near future with a resulting decrease in its cost, a better method of unit dosage, and increased efficiency of treatment.

Bendall E C Adrenal Cortex Extract *J Am M Ass* 1935 105 1486

By the use of preparations of cortin which possess the physiological activity which has been described, a large number of patients with Addison's disease have been treated at the Mayo Clinic and during the past two years no patient has died when under direct observation there, from adrenal deficiency alone. In three cases however, survival resulted in the development and extension of tuberculosis in various parts of the body. In one case military tuberculosis developed in another there was an exacerbation of pulmonary tuberculosis and in a third tuberculosis of the spine developed with abscess formation. The first two patients died with tuberculosis as the principal cause of death. As Snell has pointed out, it seems highly probable that patients with Addison's disease which is adequately controlled with cortin may develop tuberculous lesions in other parts of the body and this adds greatly to the difficulties of treatment. Two patients with severe Addison's disease which was controlled with cortin have undergone major operations one a nephrectomy and the other, a spinal bone graft. Three patients have been operated on for tumors of the adrenal glands. Definite symptoms of adrenal deficiency were present after the operation and the patients probably would not have survived without adequate treatment with cortin. These results are evidence that surgical operations are now possible even in the presence of Addison's disease.

Before the isolation of insulin surgical operations on the diabetic patient were attended with a high mortality. Experience has shown that surgical intervention has a far greater risk in Addison's disease than in diabetes. Even the type and duration of the anesthesia are of great importance. By the use of a satisfactory preparation of cortin, which is now available the surgeon can operate without undue risk on patients with Addison's disease, and operations on tumors of the adrenal gland itself may dramatically bring about restoration to a normal condition. For the group of patients under observation at the Mayo Clinic cortin has proved as specific and useful in Addison's disease as insulin in diabetes.

Gray J The Effects of Obstruction of the Urinary Tract with Particular Relation to the Formation of Stones *Brit J Surg* 1935, 23 451

Pathological lesions in the urinary tract are most liable to occur in the presence of obstruction. However it is sometimes impossible to say what the primary cause of some cases of hydronephrosis may be.

The author cites the case of a Chinese patient thirty years of age who was admitted to the hospital with severe hematuria following a blow on the back with an iron bar. A diagnosis of rupture of the kidney was made and expectant treatment was instituted. When it was possible to examine the patient a diagnosis of hydronephrosis with calculi was made. It was impossible to say whether the kidney condition was present prior to the injury or

not. As a result of this observation the author considered it desirable to investigate the condition of the urinary tract in cases of obstruction and to determine whether stone formation is liable to occur in an experimental obstruction.

In a series of rabbits one ureter was ligated and the condition of the obstructed and unobstructed sides investigated. Twenty five of the rabbits were kept on a normal diet with complete obstruction for a period averaging at least three months. In these animals there was no stone formation. Fifteen rabbits were put on a stone producing diet for a period of three months. Stones were formed in four none of the stones occurred in the normal kidney.

The author concludes that a marked effect is produced on the blood supply, the renal tubules and the pelvic epithelium by obstruction. When, in the experiments reported, the obstruction was complete there was no tendency toward stone formation even though the rabbits were put on a so-called stone forming diet whereas when the obstruction was partial there was a marked tendency toward stone formation. The important factors seem to be an increased calcium content of the kidney and a pathological condition of the pelvic epithelium favoring the deposition of calcium around it as a nucleus.

ELMER HESS, M D

Gray J The Effect of Experimental Interference with the Blood Supply of the Kidneys with Particular Reference to the Formation of Stones *Brit J Surg* 1935 23 458

Lenche and Policard in a series of experiments theorized that deposition of calcium takes place in connective tissue of low metabolism if the blood supply is diminished particularly in the presence of hypercalcemia. Clinically it is a common observation that renal calculi develop in patients who have been recumbent for a long period of time. The authors concluded that if the blood supply of the kidney were reduced experimentally in the presence of hypercalcemia, renal calculi would form. Forty rabbits were used, twenty on a normal diet and twenty on a diet to produce hypercalcemia. To cause hypercalcemia 2.5 gm. of calcium and 1 drop of a concentrated extract of Vitamin D radiostol were added to the diet daily. It was found that on this diet the content of calcium in the urine was markedly increased and that of phosphates diminished relatively or absolutely.

The difficult part of the experiment was to reduce the blood supply without causing extensive damage to the kidney. This was accomplished by separating the two terminal branches of the renal artery and ligating one of them close to the pelvis. However, if the branch ligated was too large there was obvious necrosis of the renal parenchyma.

In no case did stones form in the normal kidney. While stones occurred on the ligated side in the animals given the normal diet as well as those on the calcium Vitamin D diet, they were three times as large in the latter.

From tests of renal function with indigo blue and phenolsulphophthalein it was concluded that there was no gross defect as a result of the functional treatment.

A sufficient number of kidneys were examined to demonstrate an obvious alkalinity of the urine of the kidney operated upon. The normal side was neutral or often acid. Stones were produced where alkalinity was more marked.

It was noticed that in the cases in which stones were present there was an abnormality of the pelvic epithelium with marked desquamation and frequently a deposit of calcium at and around the damaged areas where the desquamation was obvious.

According to the findings it is necessary to have a dietary factor such as a calcium phosphorus imbalance to produce stone and a local factor leading to precipitation of the stone forming substances.

As stones always form in the pelvis or calyces, it seems that a cavity is also necessary. In all cases there was some abnormality of the epithelial lining, and frequently the stones could be demonstrated forming around desquamated epithelium. The author believes that the dead cells formed a nucleus for the stones.

Other factors noted were an alteration in the reaction and an increased production of mucoid material. It is quite possible that these may be an influence in stone formation.

ELMER HESS, M D

Dreyfus, M R. Pyelography in Polycystic Kidneys (La pyélographie dans les reins polykystiques). *J d urol méd et chir*, 1935, 40: 201

In general, the diagnosis of polycystic kidneys is easy because palpation of the lumbar fossæ reveals bilateral enlargement of the kidneys. Occasionally cystic degeneration is unilateral or occurs in one kidney before the other.

Clinically, a diagnosis of unilateral cystic kidney is almost impossible without exploratory operation or pyelography.

The author believes that the X ray shadow in polycystic kidney is sufficiently characteristic to differentiate the condition from cancer and tuberculosis. He shows the changes by means of six roentgenograms. In the majority of cases the kidney is grossly enlarged, often extending from the level of the tenth rib to the iliac crest. The outline of the kidney shadow is clearly defined, but may show a somewhat irregular border corresponding to the convex walls of the cysts. There have been reports of rare cases with no increase in the size of the kidney.

Usually the kidney pelvis is elongated. The borders are not notched although the pelvis may be encroached upon by the cysts. The contour of the pelvic shadow always remains clearly defined. As a rule the long axis of the pelvis is usually parallel with the vertebral column, but in some cases may be at right angles or T-shaped. The calyces appear elongated, but their outlines are perfectly clear although the encroachment of the cysts may produce the appearance of numerous minor calyces. The

ureter may be displaced toward the spine, may show a considerable bend, or may even lie over the vertebræ. Pyelography will often reveal a similar change in the kidney of the other side.

In cancer the outlines are irregular, one or several calyces may appear to be amputated, shadows of pedunculated masses show in the pelvis, and there is a marked rigidity of the contour of the pelvis at the site of the tumor mass.

The article is followed by an extensive bibliography.

MARSH WILLIAM POOLE, M D

Higgins, C C. Transuretero-Ureteral Anastomosis. *J Urol*, 1935, 34: 349

Higgins reports the first case in which trans uretero ureteral anastomosis was performed on a human being. In 1906, Sharpe, of St Louis, described experimental operations of this kind on dogs and cadavers, and in 1911, Gilbride, of Philadelphia, described the operation on the cadaver. Both of these surgeons showed the operation to be anatomically feasible, but the author's case is the first in which it was physiologically successful in man. Although such a procedure may seldom be indicated, it is an anatomical and physiological possibility and adds another conservative technique to the armamentarium of urological surgery.

The author's patient was a man twenty five years of age who gave a history of frequency, urgency, nocturia, and pain in the region of the right kidney during micturition. These symptoms had been noted for about a year. Four or five months after the development of the pain, cystotomy revealed several small stones free in the bladder and others in a large diverticulum in the right side of the bladder. The stones were removed, but the diverticulum was not disturbed. After the operation the symptoms persisted.

Four months later the patient had an attack of severe pain over the bladder associated with chills and fever. Operation disclosed a diverticulum which had ruptured and a large accumulation of urine, pus, and small calculi in the pelvis between the peritoneum and the bladder. Closure of the diverticulum was followed by uneventful convalescence. The patient gained 12 lb and, with the exception of the pain in the right renal region on micturition, the urinary symptoms subsided. The pain was so severe that the patient was obliged to lie down after voiding. Tests of urine from each kidney and of urine from the bladder were negative for pus and organisms, and the findings of other laboratory tests were well within the range of normal. Cystoscopy showed hypertrophy of the trigone with some obstruction. This was resected, but the symptoms persisted. When the patient attempted to void, it was found that he had a reflux of urine up to the right kidney pelvis. This was accompanied by excruciating pain and was gradually producing a hydronephrosis and hydronephrosis.

Three operative procedures were considered: nephrectomy, re implantation of the ureter into the

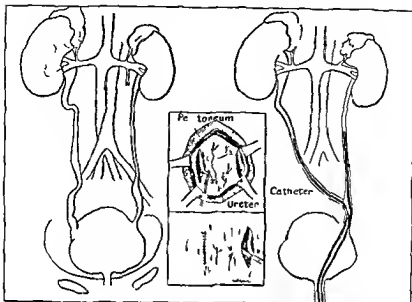


Diagram of operation

bladder and transplantation of the ureter into the rectum. As the kidney was not infected and had good function, nephrectomy seemed unwise. Reimplantation of the ureter into the bladder seemed to be contra-indicated by the possibility of numerous adhesions about the bladder due to the previous diverticulectomy. There were good reasons also against transplantation of the ureter into the rectum.

When the patient was seen in consultation with Lower, transuretero-ureteral anastomosis was regarded as the best procedure especially as the reimplantation could be done at the site of the dilatation of the left ureter without danger of stricture or impairment of function of the left kidney.

With the patient in the Trendelenburg position, the abdomen was opened in the midline. After the intestines were packed away, an incision 2 in. long was made over the right ureter. The right ureter was then freed down to within $\frac{1}{2}$ in. of the bladder where it was doubly ligated and tied. The proximal end was then fully isolated for about 3 in. The left ureter was dissected free at the site of the dilatation near the brim of the pelvis and two ureteral catheters were placed in this ureter. With a curved clamp a tract was made posterior to the parietal peritoneum from the right ureteral bed at the brim of the pelvis to the point in the region of the left ureter where the anastomosis was to be performed. The mobilized end of the right ureter was then brought through this new bed to be anastomosed to the left ureter. A small longitudinal incision was made in the left ureter and one of the catheters delivered through the opening. This end of the catheter was passed through the open end of the right ureter to the right kidney pelvis to act as a splint. The free end of the right ureter was then

anastomosed to the side of the left ureter with interrupted sutures of triple 'O' chromic catgut. The incision in the posterior parietal peritoneum was closed with interrupted sutures. Drainage was established by a stab incision through the abdominal muscles to the region of the anastomosis and the abdomen closed in the usual manner.

There was no leakage of urine. Convalescence was uneventful. The patient was discharged twelve days after the operation. Observations made one and a half years later showed both kidneys to be functioning and disclosed no evidence of obstruction at the site of the ureteral anastomosis. At the present time the patient is entirely free from urinary disturbances.

CLAUDE D. HOLMES, M.D.

BLADDER, URETHRA AND PENIS

Motz, C. The Results of Treatment in 1 000 Cases of Gonococcal Urethritis at the Hospital St. Louis (Résultats du traitement à l'hôpital Saint Louis de mille cas d'uréthrites gonococciques). *J. d'urolog. méd. et chir.* 1935 40 215.

At the Hospital St. Louis, Paris, during 1932 3 500 cases of gonorrhea were admitted. Because of the large number most of the patients had to perform the urethral irrigations themselves. However, every patient returned to the clinic physicians every eight days for re-examination and treatment.

This report is based on 1 788 male patients who reported to the clinic between December 20 1932 and June 12 1933. Of these 275 did not return to the clinic, 513 abandoned the treatment so that complete cure could not be verified and 1 000 were treated by lavage with potassium permanganate until cured.

Of the latter, 18 per cent were cured within one month, 44 per cent within six weeks, 67 per cent within two months, and 88 per cent within three months. The author gives also the incidence cure in the same time intervals in cases of infection of both the anterior and the posterior portions of the urethra. It was noted that the condition was more resistant when the posterior urethra was involved. Complications were fewer and the total duration of the illness was shorter when treatment was begun within a day or two of the onset of the urethritis.

In the resistant cases irrigation with permanganate solution was not sufficient. Medicated bougies, mercurochrome, vaccines, and urethral and prostatic massage were required for cure.

There were 258 complications in the reviewed cases. Sixty nine developed before the treatment was begun and 189 during the course of treatment. Only 13 per cent of the patients had rheumatic symptoms. In no case were these symptoms severe. They were promptly relieved by the administration of antigenococcus vaccine supplied by the Pasteur Institute.

The author concludes that large irrigations with potassium permanganate are most effective in the treatment of gonorrhea and that when they are used the incidence of complications is lower than in cases treated by the injection of antiseptics into the urethra by syringe.

MARSH WILLIAM POOLE, M D

GENITAL ORGANS

Thompson, G J. Recurrence of Urinary Obstruction Following Transurethral Prostatic Resection. *J Urol*, 1935, 34 405

Of a series of 1,694 patients subjected to transurethral resection of the prostate at the Mayo Clinic during the interval from January 1, 1913, to January 1, 1935, 49 have returned and have been operated on again for the relief of urinary obstruction. Of these 49 patients, 16 suffered originally from carcinoma of the prostate, 10 from a median bar formation or contraction of the vesical neck, and 23 from adenomatous enlargement of the type formerly treated by prostatectomy.

The 10 patients who had a median bar formation or contraction of the vesical neck belong to the group for which a punch operation has been acknowledged the operation of choice. Symptoms of urinary obstruction recur in a greater proportion of cases of this type than in a group of cases in which there is adenomatous enlargement of the prostate.

The 23 patients with adenomatous hyperplasia probably all had a certain amount of regrowth of prostatic tissue although 6 of them said they had never been completely relieved by the first operation. In 5 others a definite new growth could be recognized by cystoscopy.

In every case in which there was a recurrence, the postoperative stay in the hospital was shorter after the second operation than after the primary opera-

tion. Without exception, the convalescence was smooth.

Recurrent urinary obstruction following transurethral resection will be infrequent if the primary operation is thorough. If a good functional result is not obtained immediately, it is best to remove more tissue without delay.

Greater deformity of the prostatic urethra results from suprapubic or perineal prostatectomy than from prostatic resection. Recurrent intra urethral proliferation of adenomatous tissue is little, if any, greater after transurethral resection than after prostatectomy.

Up to the present time the percentage of cases in which urinary obstruction has recurred after transurethral resection is much less than predicted.

MISCELLANEOUS

Compan, V. Aortography in the Service of Urology (L'aortographie au service de l'urologie). *Arch d mal des reins et d organes génito urinaires*, 1935, 9 453

Aortography has been relatively recently proposed by Dos Santos (Lisbon). It consists essentially in making a roentgenogram of the abdomen immediately after injection of the abdominal aorta with a suitable contrast substance such as a concentrated solution of sodium iodide, thorium in the form of thorostrat, collothor, or any of the opaque substances which are ordinarily used for descending pyelography. The inferior extremities are excluded by the application of pressure.

The technique of this procedure is the same as that of lumbar puncture, but the needle is directed upward so that the aorta is punctured in its fixed part, i.e., between the pillars of the diaphragm.

As aortic puncture is painful, the induction of spinal or inhalation anesthesia is necessary.

To illustrate the value of this method, Compan reports the case of a female patient who gave a history of having been stabbed in the right lumbar region some time previously. When the patient was seen at the clinic there was a tumefaction in the right groin which extended into the iliac fossa and the hypochondrium. At operation, incision of the fascia transversalis was followed by profuse bleeding and the surgeon, suspecting an aneurism of the renal artery, stopped the hemorrhage and closed the wound. Subsequent arteriography disclosed an intact renal artery and the patient was reoperated upon successfully.

In order to obtain a good picture of the abdominal vessels and of the renal circulation Compan has adopted a new technique which permits rapid passage of the contrast substance into the aorta (at the rate of 5 c cm per second). The roentgenogram is made as soon as the opaque substance is present in maximum concentration in the arterial branches of the aorta.

In discussing the applications of this method, Compan expresses the opinion that arteriography is

of great aid in the diagnosis of arterial anomalies in the kidney. With the described method the presence of abnormal inferior polar arteries and the resulting pathological changes in the renal pelvis may be promptly detected.

The method is of value also for the early diagnosis of renal neoplasms which give rise to marked vascular changes. In tuberculosis, in which ureteral catheterization cannot be performed, arteriography is far superior to descending pyelography because it will disclose the circulatory changes in the diseased kidney in comparison with the normal arterial distribution of the other kidney.

The method is furthermore of great value in localizing pathological processes which otherwise would be difficult, if not impossible, to diagnose. Dos Santos reported a case of hydatid cyst of the inferior pole of the spleen in which the condition was diagnosed by aortography and the diagnosis confirmed at operation. **RICHARD E. SOMMA.**

Campbell M F Urological Injuries. *Am J Surg* 1935 30 327

Most urological injuries are potential medicolegal problems due to the increasing use of motor vehicles which cause more urogenital traumas than any other single agent. Correct diagnosis and treatment are both the humanitarian ideal and sound economics. There are many cases in which death is the direct result of a urological injury caused by a motor vehicle, and a charge of murder may be made.

Urosurgical injury must also be considered. The most common forms are urethral and vesical trauma coincident to cystoscopy, perforation of the ureter, trauma caused during pyelographic study or during treatment of the upper urinary tract and division of the ureter during an operation such as hysterectomy. Among important genital injuries are accidental subtotal amputation of the penis during rabbinical circumcision. These various injuries may provoke civil suit and when fatal, criminal suit.

It must not be forgotten that in many instances subjection of the patient to the procedures necessary to make a diagnosis is sometimes poor surgical judgment as it may result in death from shock or hemorrhage.

Renal injuries may be classified as contusions, lacerations, ruptures, crushings, and penetrating wounds. Injury of the renal pedicle is usually considered separately. In fifteen years fifty-five cases of renal injury were treated in the Bellevue Hospital, New York.

The kidneys may be injured by abdominal, loin, or lumbar blows crushing accidents indirect force, sudden muscular exertion, or penetrating wounds. In some cases renal trauma may be an occupational injury. Penetrating wounds are usually caused by bullets, knives, the limbs of trees or fence pickets. Perforation of the renal parenchyma by a ureteral catheter or injury by pyelographic extravasation are seldom important although they may provoke a suit for malpractice. Pre existing renal disease,

particularly hydronephrosis, predisposes to renal injury. It must be remembered that injury of the renal arteries is followed by loss of function and subsequent atrophy.

Renal injury is accompanied by one or more of the following manifestations: shock, hematuria, renal pain, tenderness in the loin, inspiratory pain, the appearance of a mass in the loin, pallor, falling of the blood pressure, a diminution of the circulating red cells and hemoglobin, a variable elevation of the white cells, anuria, and coma. Hematuria is the most characteristic sign of renal injury. It occurs in approximately 95 per cent of all cases. Its source can be determined only by a complete urological examination.

The course of the condition depends on the severity of the lesion and whether infection occurs or not. The prognosis depends on the severity of the injury and its associated complications. The mortality is slightly lower in cases in which operation is done than in those not treated surgically.

The treatment is conservative when hematuria and other signs of bleeding disappear promptly. The body fluids are restored by the transfusion of whole blood or the administration of 5 per cent glucose in physiological salt solution by intravenous infusion or hypodermoclysis. When immediate transfusion cannot be performed, the intravenous injection of whole blood or of horse serum may favor hemostasis. Excretory urographic studies may be made when the bleeding ceases. Fortunately most injured kidneys do not require immediate exploration and various important factors concerning the patient's condition may be determined without undue haste.

The patient should be kept quiet in bed until there has been no hematuria for a week. This is particularly important in the cases of children.

Surgical treatment is of course necessary when there is evidence of intraperitoneal injury. Nephrectomy should not be performed until the presence of a good kidney on the other side has been established. Free retroperitoneal drainage is always necessary when the kidney has been merely ligated and not removed. When a renal pedicle has been lacerated close to the aorta or vena cava and when, following nephrectomy, ligation of the pedicle is difficult, clamps should be left on the untied pedicle.

Penetrating wounds should always be treated conservatively. Among the complications is secondary hemorrhage. Secondary renal, perirenal, subphrenic, pleural and intraperitoneal suppuration are often directly fatal. Occasionally, duodenal fistula, pyonephrosis, or secondary hydronephrosis develops.

The ureter is rarely injured. Wesson has shown that it is impossible to rupture a normal ureter by the passage of a ureteral catheter. Excretory urography will doubtless indicate the site of the injury and show the extravasation. Commonly, nephrectomy is demanded.

The bladder is subject to the same types of injury as the kidney. Ninety per cent of all ruptures of

the bladder occur in males. The vulnerability of the bladder is in direct proportion to the distention of the organ. Vesical rupture is frequently accompanied by or associated with pelvic or other fractures. Whenever the pelvis is fractured, rupture of the bladder should be suspected. In two thirds of all cases of vesical rupture the rupture is intraperitoneal and free fluid is found in the abdominal cavity. The symptoms of vesical rupture are shock, cardiovascular depression, pain low in the abdomen, hematuria, dysuria or inability to void, and gastrointestinal disturbances. Delay in recognition of the condition greatly increases the mortality.

The most commonly employed test for rupture of the bladder is catheterization. Blood rather than urine may be obtained. Clots may plug the catheter. The injection of a known amount of fluid and measurement of the quantity returned is seldom an accurate observation.

Of forty one cases of ruptured bladder in which the catheterization test was used in Bellevue Hospital, New York, it was found of diagnostic value in thirteen.

Cystography is the simplest method of demonstrating vesical rupture. Cystoscopy is frequently impossible.

In all cases the prognosis is grave. The treatment indicated is supportive and operative. Operative speed is imperative. The principle of operation is the establishment of free suprapubic drainage.

The complications are peritonitis or death from associated injury of other viscera.

The nature of injuries of the penis depends upon their cause. The most common injury is due to the

application of a constricting force around the organ. Injuries involving the corpora may be followed by cicatricial distortion and render erection imperfect or painful. If there is great damage it is necessary to short circuit the urine by suprapubic or perineal drainage. When the blood supply has been severed amputation is necessary.

Injuries of the urethra are not uncommon. Rupture of the urethra usually follows injuries of the perineum and may be produced by instrumentation. The first procedure indicated is suprapubic drainage. If the urethra is severed it should be repaired at once. Every case of ruptured urethra should be treated for a long period of time by dilatation. If proper treatment is given the prognosis is good. With the development of a periurethral phlegmon or urinary extravasation the prognosis is that of the complication.

Injuries of the scrotum, tunica vaginalis, testicle, epididymus, or spermatic cord are usually the direct result of a blow. Orchidectomy is indicated when torsion of the testicle cannot be reduced and may be indicated by secondary infection.

Injuries of the spermatic cord are usually not serious except that they cause sterility.

Injuries of the prostate and seminal vesicles are rare.

In conclusion the author says that when operative work is required for injuries to the genito urinary tract speed is imperative. Shock and hemorrhage must be considered. In general the surgeon should be content to stop hemorrhage, repair important structures, and establish free drainage.

ELMER HESS M D

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC

Fairbank H A T Generalized Diseases of the Skeleton *Proc Roy Soc Med Lond* 1935, 28 1611

Any disturbance of the blood calcium or phosphorus, the enzyme phosphatase the internal secretions especially the pituitary and parathyroid secretions, or of the Vitamin D content of the diet will cause disease or maldevelopment of the bones.

In osteogenesis imperfecta the bones are honeycombed by cystic lesions and there are frequent fractures. In some cases the blood calcium is normal.

In osteopetrosis or marble bones the roentgenograms show a marked increase in the density of the bones. The condition may be local or generalized. In some cases the bones are quite friable and have a chalky appearance. There may be alternate bands of dense and chalky bone.

Dyschondroplasia is a cartilage disease. The cartilage appears in irregular masses within the metaphysis. In one type of chondro osteodysplasia the patient is dwarfed and slow in learning to walk. In another type there may be deformities of the joints without dwarfing.

In achondroplasia there is an arrest of the growth of the limbs causing disproportion between the limbs and trunk.

In cranio cleidodysostosis the ossification of the pubis and the clavicle is deficient. There is some evidence of hereditary transmission of the condition.

Osteitis deformans affects chiefly the tibia and femur. Sarcomatous changes are said to occur sometimes in the affected bones but the author thinks this is very rare.

Under errors of metabolism are grouped osteomalacia and coeliac rickets. The former is regarded by some clinicians as rickets developing after growth has stopped. Deficient excretion by the kidneys has been suggested as a cause of renal rickets. Severe deformities occur at the ends of the long bones. Coeliac rickets seems to be the result of a deficiency of Vitamin D calcium and phosphorus. It responds to treatment with light and other treatment suitable for infantile rickets.

WILLIAM ARTHUR CLARK M.D.

Hunter D Studies In Calcium and Phosphorus Metabolism in Generalized Diseases of Bones *Proc Roy Soc Med, Lond* 1935, 28 1619

Hyperparathyroidism. The general resorption of calcium from all of the bones in osteitis fibrosa is the result of hyperfunction of a parathyroid tumor. The condition is characterized by a high serum calcium

low plasma phosphorus, high phosphatase an increased output of calcium in the urine, and generalized decalcification of the skeleton. The blood calcium may vary from 12.6 to 23.6 mgm and the blood phosphorus from 1 to 2.7 mgm per 100 c.c. The thyroid tumor is rarely palpable. Subtotal removal of the parathyroids results in striking improvement. The pains in the bones and systemic symptoms disappear. The blood calcium and phosphorus return to normal, and the roentgen appearance of the bones improves. In sixty recorded cases there were two postoperative deaths. This parathyroid condition was discovered about ten years ago and its outlook is now most promising.

Locals of osteitis fibrosa with cyst formation and spontaneous fracture as seen in adolescence has no relation to the parathyroids.

Thyrotoxic osteoporosis. Although the blood is normal, the calcium excretion may be increased eight times. A decrease in the bone calcium occurs in fewer than half of the cases.

Osteitis deformans (Paget). Although this is a disorder of mineral metabolism the blood calcium and phosphorus are normal. No enlargement of the parathyroids has been demonstrated. The calcium output in the urine may be increased four or five times. The condition is accompanied by pain in the bones and general debility. No known treatment has any effect upon it.

Multiple myeloma. A serum calcium of from 13.4 to 10.1 mgm per 100 c.c. in this disease has been recorded. The plasma phosphorus may also be high when there is renal insufficiency.

Carcinoma of bones. This process may be either osteoplastic or osteoclastic. When it is osteoclastic the calcium output may be two or three times normal. The phosphatase is raised but the blood calcium and phosphorus are normal.

Osteosclerosis. In two of three cases examined the calcium excretion was twice the normal. In the third it was normal. The blood calcium phosphorus and phosphatase were normal.

Osteomalacia. In this disease there is a diminution in the density of all of the bones and in some cases spontaneous fractures occur. A few cases may be cured by proper diet including Vitamin D and calcium salts. The blood calcium and phosphorus may be normal. In cases with fatty stools anemia and infantilism the calcium is usually low and the phosphorus ranges from low to normal. The fecal output of calcium is high and the urinary output low. The bones are decreased in density.

Generalized osteoporosis with renal glycosuria. In two of the author's cases of this condition the neck was explored for parathyroid tumor but no tumor was found. Both cases showed a slight increase in

the blood calcium, a very low phosphorus, a slightly raised phosphatase, and an increased total output of calcium

Hunter reports in detail seven cases of generalized bone disease

The article contains six roentgenograms and numerous tables of the findings of laboratory investigation

WILLIAM ARTHUR CLARK, M D

Moehlig, R C, and Murphy, J M Paget's Disease (Osteitis Deformans) *Endocrinology*, 1935, 19 515

Of twelve patients with Paget's disease, five gave a family history of diabetes mellitus In the families of each of these five there was at least one member 70 in or more in height Also in five families, one or more members weighed 200 lbs or more These observations lead to the conclusion that constitutional inheritance plays a major rôle in the development of the disease

It is known that the serum phosphatase is increased from ten to fifty times normal in Paget's disease This was true in the cases reviewed Bodansky and Jaffe have suggested that determination of the serum phosphatase might be used in searching for the earliest evidence of the disease in families Moehlig and Murphy state that one should watch also for osseous dystrophies in families with diabetes and tallness

The response of five of the authors' patients to glucose tolerance tests was not unlike that of true diabetics These five were therefore placed on a weighed diet with insulin Cessation of the bone and head pains and an increase in strength were noted almost immediately, and there was an accompanying drop in the blood phosphatase In the opinion of many who have studied Paget's disease the condition is generally accompanied by atheromatous degeneration of the arteries *One believes that the disease is the result of chronic cardiovascular disease*

The work of Haussay and associates has demonstrated that the pituitary gland plays a leading rôle in carbohydrate metabolism Joslin has shown that diabetic children are overgrown He attributes the overgrowth to a pituitary element The assumption of a relationship between the familial tallness found in Paget's disease and the pituitary gland is logical as a relationship between the pituitary gland and osseous development has been amply demonstrated by clinical data In pituitary disturbances with calcium abnormalities the parathyroids are secondarily influenced by the condition of the pituitary

The reviewed findings therefore suggest to the authors that the function of the pituitary gland is involved primarily and the function of the parathyroid glands secondarily in the production of Paget's disease

RUDOLPH S REICH, M D

Exer E Several Diseases in Bone Transplants (Einige Erkrankungen von Knochentransplantaten) *Zentralbl f Chir*, 1935, p 1987

Because of the intimate blending of a free bone transplant in its new position with the bone tissues

to be bridged it is not surprising that diseases of the soft tissues or the bone of the surrounding area can pass over into the transplant The author reports five cases in which this occurred In the first case a streptococcal infection involved the transplant in a tibial defect by the hematogenous route In another case amputation became necessary because a metastasis from an endothelial sarcoma formed in the transplant It was probably not an extension from the adjacent tissues In another patient the lower third of the radius was replaced with the lower end of a tibia from an amputated leg The operation was done on account of chondrosarcoma Twenty-four years later a large mucilaginous focus was demonstrated in the transplant and proved by microscopic examination

In the fourth case, resection of the radius was done because of osteitis fibrosa and non-union following fracture and the defect was bridged with bone from the tibia After seven years the roentgenogram showed that the osteitis fibrosa had advanced throughout the entire transplant from both diseased metaphyses It is not known whether the transplant was embedded with its own periosteum or whether the periosteum remained preserved in the defect (The operation was not performed by the author) Lever expresses the opinion that the encroachment of the changes due to osteitis fibrosa into the transplant was probably caused by periosteum remaining *in situ* In the fifth case he reports, abnormal resorption occurred in a pathological fracture of the forearm of a girl sixteen years old and in the transplants used in the repair The defects in the radius and ulna resulting from the resorption were replaced by transplants from the fibula and tibia respectively Marked resorption occurred in both transplants Aluminous osteitis with concentric atrophy was suspected As this condition is based on endocrine disturbances, systemic treatment was first instituted Later, a more extensive plastic repair of the bone gaps was undertaken and as much as possible of the indurated tissue enveloping the earlier resorbed transplants was removed To date, no complications have developed

(F SCHMUTZLER) BARBARA B STIMSON, M D

Bastos, M, and Mazo, L Recent Observations on Gunshot Wounds of Joints (Observaciones recientes sobre heridas por armas de fuego en las articulaciones) *Actas Soc de ciruj de Madrid*, 1935, 4 157

Most of the gunshot wounds of joints seen by the authors recently have been late ones Either they were treated merely as wounds of the soft parts, not being recognized as joint wounds, or it was impossible for the surgeons at the front to give them the necessary immediate care In early cases the treatment is surgical cleansing of the wound by the removal of foreign bodies and injured tissue The period of time within which surgical cleansing is permissible as the method of treatment is longer in joint wounds than in wounds of the soft parts In wounds of the soft

parts, infection begins within six hours unless treatment is given. In injuries of joints, the period of safety is twenty-four hours as the bacteria are resisted by the synovial membrane. Within this time surgical cleansing of the wound and irrigation of the joint cavity with an isotonic fluid generally prevent infection. This method is called "ideal arthrotomy" and often brings about healing by first intention and normal function.

As a rule injuries of the joints cannot be sutured primarily. Drainage is generally necessary. In doubtful cases it is better to drain than to close. In infections of the joints it is better to drain the penarticular spaces and recesses than the joint cavity itself. The site of the infection is apt to be in the loose cellular tissue around the joint. The more severe the injury the more this is true. In severe cases of such infection the classical incisions for arthrotomy are apt to be insufficient and the wound should be opened by multiple atypical incisions.

Multiple atypical incisions are particularly necessary in wounds of the knee where drainage is very difficult because of the anatomical conditions. The hip, though a larger and deeper joint, is not nearly so difficult to drain as the knee because it has only a single joint cavity. Willemss opens the whole knee joint from side to side as for a resection. The author believes this is too severe a method. He has found that active mobilization is facilitated by keeping the limb suspended with hammocks and arrangements similar to those used in fractures of the femur. Small bits of detached bone may be removed but one joint surface should not be removed with the other left intact. In some cases it may be necessary to excise both joint surfaces. In wounds of the hip the limb should be suspended in semiflexion and abduction combined with wire traction if there is a great tendency toward luxation of the head of the femur.

In the discussion of this report BRAVO Y DIAS CARDOSO advocated freshening the edges of the wound cleansing and then closing the capsule primarily. He irrigates with Chlumsky's fluid (camphorated phenol). After closure of the joint a puncture is made the exudate removed, and from 3 to 30 c.c. of the fluid injected. After twenty-four hours the turbid serofibrinous fluid is removed and if the joint is still painful on pressure the irrigation is repeated once or twice. This treatment prevents phlegmon of the joint. AUDREY GOSS MORGAN M.D.

Doub, H. P. and Jones, H. G. An Evaluation of Injury and Faulty Mechanics in the Development of Hypertrophic Arthritis. *Am J Roentgenol* 1935, 34, 315.

In this study the authors attempt to determine the effect on the neighboring joints of trauma sufficient to produce fracture of the bone. In order to rule out callus formation as a complicating factor, 30 cases were selected from a group of 600 in which the fracture did not involve the joint itself. The effect of faulty joint mechanics on the production of

reactive changes about the joint are also considered.

In 28 of the 30 cases studied roentgenographically there was no evidence of arthritic changes after a period of eight months. One of the 30 patients showed evidence of arthritis at the time of fracture, but there was no apparent accentuation of the arthritis in the later roentgenograms. One case in which healing occurred with a varus deformity later showed a beginning arthritis.

These findings, while taken from a small series, seem to indicate that a single severe trauma is not of much, if any importance in the production of hypertrophic arthritis. In the case showing beginning arthritic changes the fragments had united in such a position that the mechanics of the nearby joints were disturbed. This has been shown to be a frequent cause of hypertrophic arthritis.

The authors feel that advancing age with its attendant factors of arteriosclerosis with loss of elasticity and fibrillation of the cartilage is one of the most important factors in the production of hypertrophic arthritis. This also includes long standing wear and tear and minor traumas.

The mechanical theory as to the etiology of hypertrophic arthritis must certainly be given a great deal of consideration. Faulty local mechanics, as in angulation of a long bone projecting the lines of force in such a way as to produce abnormal pressure on certain parts of the articular surfaces of the nearby joints may produce quite marked change in the joint. The cartilage shows evidence of gradual erosion in the areas of abnormal pressure and this is followed by eburnation of the bone and marginalipping. There may be anatomical changes also that produce more general changes such as extensive scoliosis of the spine, which may not only affect the vertebrae but also produce unequal strain upon and therefore affect, the peripheral joints.

NORMAN C. BULLOCK M.D.

Miller, R. Traumatic Hemangiomatous Tumors of the Skeletal Muscle. *Bull J Surg*, 1935, 23, 245.

The author reviews the literature on hemangiomatous tumors of skeletal muscles and reports a typical case. Of the 256 cases reported in the literature the tumor occurred before the age of twenty years in 80 per cent and before the age of thirty years in 95 per cent.

Hemangiomatous tumors of skeletal muscles are found most frequently in the lower extremities, especially the thighs. They are round or ovoid masses varying in size from that of a nut to that of an egg. They grow slowly and at first painlessly. They vary in consistency. As a rule they are diffuse, and often they are tender. The overlying skin is normal and freely movable. Pain usually develops. Impairment of function is common. The diagnosis is rarely made before operation.

On pathological section the tumors are usually found to be bluish or reddish but sometimes are grayish or yellowish white. Microscopic examina-

tion shows them to be made up chiefly of vascular elements in a connective-tissue stroma, thick walled arterioles, and dilated capillaries. In the central part the remnants of striated muscle are sometimes completely degenerated. Toward the periphery the fibers are better preserved.

The case reported by the author was that of a boy twenty one years old who sought treatment for a swelling of the upper part of the left arm of two months' duration which had developed two months after an injury to the arm. Examination disclosed a smooth, firm, and elastic ovoid swelling about the size of a hen's egg on the inner and posterior aspect of the arm. The skin overlying the swelling was normal in appearance and freely movable. The swelling was not attached to the bone and was movable to some extent in a transverse axis. It became more prominent and fixed when the extensor muscles were tightened. Its borders were poorly defined, and it was slightly tender. A provisional diagnosis of fibroma of the triceps muscle was made and excision advised.

At operation, the triceps muscle was exposed and an infiltrating tumor mass excised from the belly of the inner head. To get clear of the growth, it was necessary to sacrifice a considerable amount of the muscle.

Recovery was uneventful. Three months later there was no demonstrable functional impairment of the arm.

On section, the tumor was found to contain a partially organized blood clot. Microscopic examination revealed characteristic young fibrous connective tissue, capillaries, and a very extensive overgrowth of the smaller muscle walled arteries.

By most of those reporting such neoplasms, trauma is regarded of secondary etiological importance to the congenital factor. However, on the basis of the literature and his study of the case reported in this article, the author presents an argument emphasizing the importance of trauma. He states that the relatively frequent occurrence of the tumors in muscles is itself suggestive of trauma as the muscles are subject not only to external trauma but also to injury dependent on their inherent contractile power. Hemangiomas of muscles apparently never follow the complete rupture of muscles or fractures associated with muscle injury, doubtless because these conditions are treated by rest and immobilization. The author believes it reasonable to assume that in cases of minor injuries in which only a few muscle fibers are torn and rest is not enforced a blood clot forms and the torn fibers retract. Granulation tissue then fills the gap and is subjected to trauma by contraction of the muscles which causes capillary hemorrhage and further damage to the muscle fibers, this cycle of reactive changes producing the growing tumor. The angiomatous nature of the tumor is due undoubtedly to the relatively large blood clot which also offers a favorable medium for excessive cell proliferation. The occurrence of the tumors in young persons may

be explained by the more frequent exposure of young persons to trauma and the fact that in young persons the regenerative processes are greater than in older persons.

RUDOLPH S. REICH, M.D.

Birnbaum, W., and Callander, C. L. Acute Suppurative Gonococcal Tenosynovitis. *J Am M Ass*, 1935, 105 1025

The primary foci of infection in acute suppurative gonococcal tenosynovitis may be the urethra, Bartholin's or Skene's glands, the cervical glands, prostate, seminal vesicles, or conjunctiva. By careful technique the gonococcus can be isolated in many cases. More men are affected than women, the ratio being 3:1.

The sheaths of the extensor tendons, especially those of the common extensor tendons of the fingers, thumbs, and toes, are affected most frequently.

Gonococcal tenosynovitis may occur in either acute or chronic forms. Acute gonococcal infection in the tendon sheaths is usually characterized by a mild inflammatory reaction with or without effusion. The severe forms produce frank suppuration. With the production of an exudate, an elongated fusiform swelling of the tendon sheaths may appear.

The tendons may show punctate hemorrhages, but are rarely destroyed as in streptococcal and staphylococcal infections. Complete absorption, the formation of adhesions, deformity, and severe functional disturbances may occur following the serous, seropurulent, or phlegmonous processes of the inflammation.

The diagnosis of gonococcal tenosynovitis is made on the basis of a history of venereal disease and clinical and laboratory observations. Kanavel stressed the importance of considering a hematogenous gonococcal infection in cases of tenosynovitis of obscure origin.

The signs of acute suppurative tenosynovitis are essentially those found in staphylococcal and streptococcal infections: swelling, redness, tenderness along the course of the tendon sheath, and limitation of motion. As a rule neither local symptoms (such as pain) nor general reactions (such as fever and leucocytosis) are as marked as in the pyogenic type. In all of the cases spontaneous or provoked pain is extreme and voluntary movements are difficult or impossible.

Twenty-four hours after the onset of tenosynovitis it may not be possible to demonstrate the gonococci by direct smear, but a positive culture may be obtained. After a few days even a culture may fail to show gonococci. Immediate bacteriological examination is therefore imperative.

The treatment of acute suppurative gonococcal tenosynovitis is the establishment of adequate drainage.

The author reports two cases of gonococcal tenosynovitis. The patients were women twenty and twenty-three years of age. Both had a pelvic infection, smears of which proved positive for gonococci. A smear of pus taken from the tendon sheath in one

case was positive for gonococci. In the other case the material became desiccated before bacteriological studies could be made.

NORMAN C. BULLOCK, M.D.

Zweigbergh, J. O. von. The Functional Prognosis in Cases of Severed Finger Tendons (Die funktionelle Prognose bei abgeschnittenen Fingerschienen). *Stenok Lakartidningen* 1935 p. 1064.

This article is a review of cases of severed finger tendons from the files of the Swedish Government insurance system. Such a review is of special value because it includes a much larger number of cases than can be obtained from single clinics; the end results can be studied over a much longer time and, since cases from all parts of the country are considered, a better picture is obtained than if the work of only one clinic is reviewed as the results in one clinic may represent the work of only one or two specialized surgeons.

The author reviewed the cases between the years 1918 and 1923 and those in the year 1931, which totaled 688. These included only cases without complicating bone nerve or blood vessel injuries. All were cases of complete tendon severance. In drawing his conclusions the author used the insurance evaluation of the results. The cases are classified into those with a good result, i.e., cases in which a cure was recorded without further comment; those with a medium good result, i.e., cases in which the disability was less than 10 per cent and there was no reason for compensation; and those with a poor result, i.e., cases in which compensation was paid for a longer or shorter time after termination of the treatment.

Primary suture was done in 477 extensor tendons and 174 flexor tendons. A good result was obtained in 80 per cent of the extensor tendons but in only 45 per cent of the flexor tendons. In 11 per cent of the primarily sutured extensor tendons and 39 per cent of the primarily sutured flexor tendons the result was poor.

Secondary suture that is suture later than twenty-four hours after the accident was performed 32 times. In 72 per cent of the tendons so sutured (25 extensor tendons and 7 flexor tendons) the result was good. In 4 cases the result was poor.

One extensor tendon and 4 flexor tendons were not sutured. The result was good in 3 and poor in 1 (flexor tendon).

The causes of the poor results and especially of permanent injuries after primary suture were scar contractions in 47 per cent of the cases, infection in 27 per cent, suture failure in 16 per cent, and unknown causes in 16 per cent.

Of the total number of cases 23 per cent were treated by general practitioners and the others in clinics or hospitals. Of 22 patients more than sixty years of age, 10 had a poor result. Of the cases with poor results permanent reduction of working ability exceeding 20 per cent occurred in only 6 per cent.

(GERLACH) LEO A. JÜNKE, M.D.

Lipshutz, B. Late Subcutaneous Rupture of the Tendon of the Extensor Pollicis Longus Muscle. *Arch Surg* 1935 31: 876.

Subcutaneous rupture of the tendinous segment of the extensor pollicis longus muscle as a late complication of a Colles fracture is extremely uncommon.

The rupture has been variously explained. Some attribute it to trauma, believing that the tendon becomes strangulated in the sheath by rupture of the tenaculum tendinum containing the nutrient blood vessels and that then lacking sufficient nourishment, the tendon degenerates atrophies and eventually ruptures during some slight movement of the thumb. Others are of the opinion that such a rupture can occur only in the presence of pathological changes in the tendon such as tenosynovitis, tuberculosis, syphilis, inflammatory changes, or tumor. As frequently no disease of the tendon can be considered a predisposing cause it seems reasonable to assume that some type of injury to the tendon occurred coincidentally with the fracture.

The author states that a tenable explanation of the mechanism of this injury to the tendon is best obtained by an analysis from the morphological point of view. The following three factors should be considered: (1) the anatomical variations in the groove of this tendon on the distal dorsal surface of the radius, (2) the anatomical course of the tendon, and (3) the blood supply of the tendon. The groove for the extensor pollicis longus tendon is narrow and oblique, and frequently bordered by well marked ridges. The ridges and the groove give origin to strong fibers which strengthen the dorsal radiocarpal ligament. The latter serves as an additional agent fixing this tendon in its narrow and oblique sulcus.

The unique and anatomical course and fixation of the tendon appear to be important factors in the genesis of rupture of the tendon and the accompanying blood vessels. The anatomical fixation of blood vessels is one of the contributing factors in the causation of vascular injuries following a severe contusing violence.

The author reports two cases of rupture of the tendon of the long extensor muscle of the thumb. The ruptures occurred five and six weeks respectively, after a fracture of the radius. The fractures were in good position and required no manipulation for their reduction. Thus the only tenable explanation for the rupture of the tendon was an initial injury to the blood vessels of the tendon and the later development of necrosis of the tendon due to failure of the surrounding vessels to establish a collateral circulation adequate for repair.

Repair by operation should be undertaken without delay. In cases of recent rupture the lesion can be repaired by direct suture, as degeneration of the tendon occurs slowly. In the suturing of the ends of the tendon the point of attachment of the suture should be 1 cm. or more from the end of the stump in order that the latter will be left untraumatized. The suture should be tied so that the knot does not

lie between the ends of the tendon. Silk is the preferred material for sutures.

If possible, the oblique course of the tendon should be preserved. However, it is probably advisable not to use the original groove for the following reasons:

- 1 The inadequate surrounding tissue may interfere with repair. The connective tissues surrounding the tendon are of the greatest importance in the repair of a wound in a tendon. They convey blood vessels and lymphatic vessels and permit easy gliding of the tendon.

- 2 The presence of scarring and adhesions may make the groove unsuitable. The construction of a pulley by means of fascia lata, as recommended by Platt, may overcome the latter difficulty.

As an alternate method, when the entire proximal portion of the tendinous segment is destroyed, the distal end of the tendon is attached to the extensor pollicis brevis muscle, as was done in one of the author's cases. This method prevents dropping of the thumb, but cannot restore independent action of the long extensor muscle. After any method of repair, the thumb is supported in extension for three weeks. Movement may be begun cautiously after six or seven days, but no force should be exerted before the third week. Faradic stimulation of the muscle belly in the forearm may be done after the seventh day. NORMAN C. BULLOCK, M.D.

Grams, H. Cysts of the Popliteal Space (Ueber Kniekehlcysten) 1934. Koenigsberg 1. Pr., Dissertation.

All formations in the popliteal space presenting the characteristics of a true cyst with the dominant signs of a tense, elastic consistency without evidences of inflammation and with a typical course are cysts of the popliteal space. They constitute about 9 per cent of all "ganglia." They are twice as common in males as in females. They usually occur between the ages of twenty-five and forty-five years and in robust, well-nourished individuals who are obliged to stand a good deal. Their onset is insidious. They are first noticed when they cause disturbances by their size and pain in the knee joint on movement. They grow slowly and are palpable as tumors ranging in size from that of a hen's egg to that of a man's fist. They are sometimes longitudinal. They are well circumscribed against the surrounding tissues by their tense elasticity. The skin over them is easily movable. They are adherent to the underlying structures by a broad base or a pedicle. They rarely show a connection with the cavity of the knee joint. Sometimes they press upon the peroneal nerve. Dissection reveals, on the circular major portion, processes the thickness of a finger which are attached to the joint capsule or the tendon of the semitendinosus muscle by a pedicle or are adherent to them by a broad base. The cysts are usually attached medially to the semitendinosus or the gastrocnemius muscles. If the pedicle is not attached to the joint capsule it is directed toward it. Reports

that the cysts communicate with the interior of the joint through these processes are disputed.

Histologically, the cysts consist of a wall and contents, both of which are the result of a degenerative process, mucous, watery, and hyaline. The wall is usually fibrous, endothelium is rarely demonstrable. According to Payr, the contents consist of cells in hyaline degeneration. Rice bodies are rare. Floe derus describes the cysts as true tumors, arthromas, originating from the articular tissue, partly the direct result of the course of human development and partly aberrant.

The theory that the development of such cysts may be due to a single trauma such, for example, as an "accident," is rejected by the German Insurance Office. Bier considers the meshes of loose cellular tissue as basically the same as a mucosal bursa, tendon sheaths, and joints. Lymph and synovia are essentially the same. Pressure as a continuous trauma produces mucosal bursae also at sites where they do not occur normally, such as the sternum, forearm, and, in tailors, the ankles, from sitting on the haunches. In addition, heredity, a relationship to chronic rheumatism and gout, the endocrine glands, and vascular disturbances have been held responsible.

After complete extirpation the prognosis is good. Without such treatment recurrences always develop. The cysts rarely disappear spontaneously with age or under treatment by the use of a compression bandage with a lead button. The prognosis is uncertain when the cysts are the site and point of origin of tuberculous granulations, sarcoma, myxoma, endothelioma, fibroma, chondroma, chondroosteoma, or hemangioma. Calcium and urate deposits are also to be observed in them.

In the differential diagnosis, difficulty may be caused by lipomas, nodes of varices, aneurisms, and cold abscesses. Abscesses other than cold abscesses are characterized by inflammation and contracture.

The treatment consists of thorough enucleation with care to protect the large blood vessels, the joint, and the peroneal nerve. Incision, puncture, injections, acupuncture, dissection, crushing, electrotherapy, radiotherapy, and enzyme treatment are followed by recurrence. The transplantation of fascia is said to prevent recurrence with certainty.

(EGGERT) LOUIS NEUWELT, M.D.

Garavato, P. H. Cysts of the Semilunar Cartilages of the Knee (Quistes de los meniscos de la rodilla). *Rev. de ortop y traumatol.*, 1935, 5: 22.

Garavato reviews the pathology, theories of origin, clinical syndrome, differential diagnosis, and treatment of cysts of the semilunar cartilages of the knee and reports five cases. In the latter the cysts had no endothelial lining, but intravascular and perivascular changes were present. The author attributes the cysts to mucoid degeneration of the cartilage favored by a scant blood supply and in some instances by trauma. He rejects the embryonic theory because it is based on the presence of an

endothelial lining in the cysts and because the development of the synovial membrane later than the semilunar cartilages precludes the possibility of inclusions.

The article includes illustrations and a table of seventy nine cases reported in the literature, and is followed by a bibliography. M E Morse, MD

Mazzini, O F Reyes, A S, and Monzo A. Ossifications in the Tendon of Achilles. A Peroneal Bone and Trochlear Apophysis of the Astragalus (Ossificaciones en el tendón de Aquiles. Hueso peroneo y apófisis troclear del astrágalo). *Rev de orthop y traumatol* 1935 5 44

The cases reported by the authors were those of two men forty six and forty three years of age respectively. In one case the condition was bilateral. In both cases there was a history of trauma. In the first case subcutaneous tenotomy for club foot had been done forty years previously and in the other there had been an electrical burn of the foot and leg. The first patient suffered from intermittent claudication although the clinical examination revealed no circulatory disturbance. In one case a trochlear process of the astragalus and in the other a peroneal bone was seen in the roentgenogram.

The authors summarize the fifteen cases of ossifications in the tendon of Achilles which have been reported in the literature.

The article is accompanied by roentgenograms and a bibliography. M E Morse MD

FRACTURES AND DISLOCATIONS

Blehl R. The Treatment and Prognosis of Fresh Dislocations of the Shoulder (Behandlung und Prognose frischer Schulterluxationen). *Arch f orthop Chir* 1935 35 38r

This is an exhaustive report on 116 cases of recent dislocations of the shoulder. The patients ranged in age from ten to eighty years. One hundred and ten were re examined.

In the cases of anterior dislocation, which constituted 47 per cent of the total number reduction was accomplished at first by the Kocher or Hippocrates method and later by the self reduction procedure of Boehler. In the latter the patient without anesthesia of any sort sits on a chair and, with his elbow bent at a right angle grasps some firm object such as the leg of a table with his hand. Then, with the hand of the well arm he grasps the elbow of the injured arm and brings this arm into the greatest possible adduction. He then rotates himself away from the injured arm, as in Kocher's method. As a rule the head springs into the glenoid cavity with a distinctly audible snap when outward rotation reaches from 60 to 80 degrees.

In the cases of axillary dislocation, which constituted 51 per cent of the reviewed cases reduction was done by Hippocrates' method under ethyl chloride anesthesia. After the reduction the axillary nerve was tested for paralysis by asking the patient to raise the arm laterally.

The after treatment is important in the final result and therefore should receive careful attention especially in cases of old injury and complicated dislocations. In the reviewed cases of anterior dislocation in persons under thirty five years of age a retention dressing was sometimes not used. The average duration of the treatment was five days. As 3 of 35 anterior dislocations in persons under thirty five years of age recurred and 4 became habitual, the author has tried treating all such dislocations in the last few months by applying Desault's bandage for a period of two weeks. The 4 habitual cases were operated on by Finsterer's method with successful results. In the cases of the 20 patients over thirty five years of age an abduction splint was applied either immediately or after three or four days if active elevation of the arm was not possible. Simultaneously, exercises with horizontal and vertical rotation traction apparatus were given several times. The average duration of treatment in the cases of patients over thirty five years of age was forty two days.

In the 24 cases of axillary dislocation without complications a adhesive plaster traction was applied to the arm around an abduction splint immediately after reduction. Following the application of the splint a roentgenogram was taken at once to make certain that the head was in good position in the glenoid cavity. The abduction splint was not removed until the arm could be raised actively 50 degrees in the horizontal plane and placed behind the head and on the opposite shoulder. The total duration of treatment, that is the time until work was resumed, averaged thirty six days.

In the 25 cases of axillary dislocation with fracture of the tuberculum majus traction and an abduction splint were applied immediately. In the cases of patients over forty years of age the average duration of treatment was twenty six days, and in those of patients over forty years of age, it was seventy eight days.

Paralysis never occurred in the cases of anterior dislocation, and developed in only 1 case of uncomplicated axillary dislocation. It never occurred in patients under thirty years of age. As a rule it results only in dislocations with fracture of the tuberculum majus. Most frequently the axillary nerve was paralyzed. It was paralyzed alone in 5 cases, with the entire plexus in 1 case with the radial nerve in 1 case and with the ulnar and median nerves in 1 case. Paralysis of the axillary nerve always disappeared after a few weeks.

The end results depend upon the type of the injury. Of the 55 anterior dislocations reviewed 54 were cured with normal mobility and strength. In 1 case, that of a patient fifty one years old who had also a fracture of the border of the glenoid cavity, there was permanent partial limitation of motion. Of the 24 axillary dislocations without complications the 10 occurring in patients under forty years of age were cured with normal strength and mobility. Of the 14 patients over forty years of age, 11 had equally

good results. Of the 28 axillary dislocations with fracture of the tuberculum majus, only 5 were in patients under forty years of age. Of the 23 patients over forty years of age, 15 have normal strength and motion. In 8, motion is limited, but in none more than by one third of the normal.

Unusual cases observed included 2 of luxatio erecta and 1 of posterior dislocation. In all such cases cure resulted with full strength and mobility.

In summarizing the author says that in 96 cases (83 per cent of the total number), cure resulted with normal mobility and strength, in 5 (4.5 per cent), with limitation of motion amounting to less than one third, in 7 (6 per cent), with motion limited one-third, in 6 (5 per cent), with motion limited one half, and in 1 (0.9 per cent), with motion limited more than one half. Of 55 insured patients, only 2 were granted permanent disability allowances.

(REGELE) FLORENCE ANNAN CARPENTER

Sutro, C. J. Slipping of the Capital Epiphysis of the Femur in Adolescence. *Arch Surg*, 1935, 31: 345.

The author presents three cases of slipping of the capital epiphysis of the femur in which during opera-

tive correction sufficient bone was removed for examination. One case was that of a girl of eleven, one of a well developed boy of seventeen, and one of an obese boy of twelve. Histological examination of the specimens removed showed no evidence of rickets, osteomalacia, or specific osteitis fibrosa, but did show what might be interpreted as a fracture through the epiphyseal plate and through some of the contiguous osseous trabeculae. For the most part, the upper epiphyseal plate showed only scattered foci of degeneration, usually close to tears or fractures of the epiphyseal cartilage plate. Blood pigment was usually present. The buckling of the plate plus the presence of herniated segments of the epiphyseal plate either into the epiphysis or into the metaphysis would tend to support the suspicion that trauma caused many of the microscopic observations.

The author discusses the anatomy and ontogenesis of the femur and the effect of abnormal weight-bearing forces. He feels that the normal tilting of the capital epiphysis, which is the result of normal development and mechanical forces, is the basis for the lesion. Photomicrographs and roentgenograms illustrate the article.

BARBARA B. STIMSON, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Friedlaender E. Compression Treatment of Phlebitis (Die Kompressionsbehandlung der Venenentzündung) *Wien klin Wochenschr* 1935 1 791 813

The author calls to mind the Unna Fischer zinc paste bandages described in 1887 for inflammatory symptoms of thrombophlebitis of the leg which acted by compression. He states that he uses zinc paste of the following composition: zinc oxide 150 gm, gelatine 150 gm, glycerine 250 ccm, calcium hydroxide 20 gm, distilled water, ad 1000 ccm. As bandages he employs strips of gauze 8 cm wide and 10 m long with smoothly cut edges. Each layer of bandage is impregnated with the paste and from two to four layers are applied. The bandage is closed with zinc paste and covered with tissue paper or a very thin layer of cellulose. Pre-impregnated bandages are not recommended.

In order to obtain the correct pressure which is often difficult a thrombofixator bandage is used. Strips of bandage attached to a light band are laid one upon the other shingle fashion. At their free ends the strips have from twelve to fourteen button holes. The strips are directed posteriorly and as each fold is placed about the leg it is fastened at the proper buttonhole to the band with a small hook. To keep the bandage from sliding down on the thigh it is equipped with two supporters which are attached to a girdle. The knee portion of the thrombofixator consists of a band which adjusts itself to every movement. The bandage should always extend several centimeters beyond the thrombus. Compression treatment is indicated whenever suppuration or tumor does not prohibit it. Phlebitis and a temperature as high as 38 degrees C do not prevent this treatment but large furuncles and phlegmons such as open tuberculous processes and acute lymphangitis are contra indications.

After from eight to ten days the swelling of the limb has almost entirely disappeared, and standing may be permitted without danger. As a rule the treatment requires from four to eight weeks during which time the patient is able to work. At the end of that period bath treatments are of advantage.

Of the 196 patients treated by compression, only 1 woman died of pelvic embolism. In 48 cases in which the thrombus was not limited by the inguinal ligament there was 1 death that of a patient with an inoperable carcinoma of the rectum. In the 196 cases there were no deaths from thrombosis of the leg or thigh and there was only 1 death from embolism from a pelvic thrombus. The average period of inability to work was seven and three quarters days but since March 1934 (because of the absence of

badly neglected cases), it has been reduced to one day. (STREIBLER) LEO M. ZIMMERMAN MD

Contiades N, J. Ungar, G., and Naulleau J. Experimental Studies of the Vascular Action of the Contrast Media Used in Arteriography (Recherches expérimentales sur l'action vasculaire des produits de contraste utilisés en artériographie) *Presse méd*, 1935 43 1630

While arteriography has proved of definite diagnostic value, especially in arterial diseases severe and even fatal reactions from the procedure have been reported. The authors have carried out arteriography with thorotrast and parabrodil in more than seventy cases without serious ill effects.

In experiments on animals they found that the intra arterial injection of lipiodol and similar products produced lesions of the arterial walls and thrombosis. With the use of organic iodine compounds and thorotrast no histological lesions of the arterial walls were produced. However the injection of these substances into the arterial system in pathological conditions of the arteries is not without danger. Animal experiments with substances which caused no arterial lesions—parabrodil and thorotrast—showed that the intra arterial injection produced vasomotor reactions shown by an increase in the general arterial pressure when parabrodil was used, a decrease when thorotrast was employed and a slight increase in the venous pressure. These reactions were more marked in some of the animals than in others. It is to such reactions that the unfavorable effects of arteriography in some cases are to be ascribed.

The substances used as contrast media in arteriography have only a very slight vasoconstricting action *per se*. The vasomotor disturbances noted are to be ascribed to a double mechanism—an increased discharge of adrenalin and the local liberation of histamin substances. There would naturally be a wide variation in individual reactions to such contrast media as individuals differ in their sensitivity to both adrenalin and histamin. Moreover the amount of these substances liberated differs in different cases. The authors are carrying on further researches to determine the reaction of different individuals to these contrast media in order that the use of arteriography may be avoided in the cases of patients particularly susceptible to their action. ALICE M. MEYERS

Montgomery A H and Ireland J. Traumatic Segmentary Arterial Spasm. *J Am M Ass* 1935 105 1741

The authors report two cases of traumatic segmentary arterial spasm observed by them following

an operation on the arm and briefly summarize forty two similar cases collected from the literature. In one of the cases reported by the authors occlusion of the brachial artery occurred immediately after a simple supracondylar fracture of the humerus. In the other it occurred after an open operation to reduce such a fracture. Absence of pulsation was demonstrated by operative exposure of the vessels, but no cause for the condition could be found.

As a rule the disturbances are confined to the large arteries of the extremities. Of the forty four cases reviewed, they occurred in the femoral artery in sixteen, in the brachial artery in thirteen, in the radial artery in three, in the popliteal artery in three, in the posterior tibial artery in three, in the axillary artery in two, in the external iliac artery in one, and in the carotid artery in one. The causative factor in every case was a definite trauma. In twenty six cases there was an injury due to a bullet or high explosive and in ten cases a fracture of the femur, radius, or humerus.

The manner in which trauma produces such striking vascular changes has been the subject of discussion. Because of the absence of pathological changes involving the artery and because of the complete return of circulatory function after a brief period the authors are of the opinion that the condition is an arterial spasm due probably to a nerve disturbance. They believe that a sympathetic nerve imbalance causes a spasmodic constriction of the artery.

The possibility of the occurrence of such a condition as vascular spasm is quite generally admitted. Makins found that in a certain proportion of wounds in close proximity to large vessels a diminution of the normal caliber of the arteries is to be observed soon after the injury. Besides the evidence that sympathetic nerve involvement may cause arterial contraction there is evidence that somatic nerve involvement causes vascular changes. There is evidence also that not all vascular changes are under nervous control. Where local areas of blanching appear in skin that has been completely deprived of a nerve supply there may be a chemical factor that contracts the size of the vessel.

The diagnosis of the cause of arterial spasm following injury is very difficult without operative exposure of the artery. The authors suggest that measures used for diagnosis in other vascular diseases might be of value in traumatic segmentary arterial spasm.

The time of disappearance of the spasm is fairly uniform. In most of the cases studied the spasm disappeared in twenty four hours, but in one case it persisted to some degree longer than a year. The prognosis is good so far as life is concerned. Death that might have been attributed to the vascular condition occurred in only one of the forty four cases reviewed. In six cases amputation of a limb was performed because of gangrene.

Conservative methods of treatment should be

tried first. If a recent fracture or dislocation is present when the diagnosis of traumatic segmentary arterial spasm is most probable, the fracture or dislocation should be reduced, and if some other mechanical cause which might be responsible for obliteration of the pulse is found it should be removed. If there is then no return of the circulation, the artery should be immediately exposed at the site of the trauma. In the cases reported by the authors the wounds were left open, continuous warm, moist dressings were applied, and the extremity was kept at rest and elevated until the spasm disappeared. The wounds were then closed by suture. The authors believe that one of the most promising methods of treating this type of peripheral arterial occlusion is that recently employed by Reid and his associates—intermittent increased and decreased air pressure by means of an air tight chamber applied to the extremity.

HERBERT F. THURSTON, M.D.

BLOOD, TRANSFUSION

Ritter, A. Blood Replacement Under War Conditions (*Blutersatz in Feldverhaeltnis*). *Heft med. Woch.*, 1935, 2: 228.

In a short historical review the author cites the difficulties in blood replacement by blood transfusion up to and during the time of the world war. These were due to lack of simplicity in the methods of transfusion and lack of knowledge of the technique of blood group determination by standard sera according to the method of Moss.

Ritter next discusses blood replacement by blood transfusion under peace time conditions in the military hospitals of Denmark, France, Germany, and Italy and under war conditions in the armies of Holland, France, Germany, and England. He states that today the problems of blood group determination and blood transfusion are well solved and blood transfusion to replace lost blood is possible even in the field.

When blood is not available, the use of the following substitute solutions comes up for consideration: physiological sodium chloride solution, Ringer's solution, normosal, a 5 per cent solution of glucose, tyrode solution, tautolsin, and pigofusin.

The author presents suggestions for the replacement of blood in the Swiss army. On the basis of the fact that an acute loss of one third of the entire volume of blood can be corrected successfully only by blood transfusion, cases of blood loss may be divided into the following three groups: (1) those in which filling of the vessels with a substitute fluid to make up for the lost blood is sufficient, (2) those in which it is possible to replace the lost blood with a substitute fluid only temporarily and a transfusion of blood must therefore be given soon, and (3) those in which life can be saved only by the immediate transfusion of blood.

Under war conditions cases of Group 3 are seen only exceptionally. In the other cases the more

simply and more quickly help is given, the better. The farther toward the front lines that the treatment must be given the more simple, handier, and more practical must be the equipment in order that the necessary procedure may be carried out most easily and quickly. In very profuse hemorrhage, transfusion will always be too late. In moderate and smaller hemorrhages there will be time for hemostasis and transportation of the wounded to the dressing station.

As substitute fluids for use in the most advanced dressing stations, only fluids already prepared such as tufosin and pigofusin in ampoules of 250 c cm come up for consideration. In the front line as for example during a rapid advance the infusion of a substitute solution is practically the only method possible for the replacement of blood. Therefore only such fluids should be kept in the battalion dressing stations. When, in positions which are well entrenched and relatively stationary the front line dressing stations can be better built and equipped it is possible to requisition the instruments and supplies for more complicated procedures from the dressing stations in the rear. At the front transfusions of blood are possible only in well built battalion aid stations and surgical detachments which remain in the same place for some time. They can be carried out also in field and other military hospitals and military dressing stations in the rear.

Only group identical blood from a healthy donor or blood from a healthy universal donor should be used for transfusion. As donors other wounded men, especially those with slight wounds are to be considered first. Therefore it is advisable that slightly wounded soldiers be kept in close proximity to the dressing stations in order that they may be readily available. The members of the sanitary corps

should be employed as donors in only very exceptional cases.

The blood group of every recruit should be determined in the training schools. At the same time serological tests for syphilis should be made. The findings should be recorded in the service record and on the identification card, and the blood group should be tattooed on the recruit's chest or upper arm. In later schools and courses the findings should be checked if possible.

Before each transfusion the biological test of Oehlecker should be carried out. If hemolysis occurs because of a mistake in the blood grouping, it should be combated by the immediate transfusion of blood known to be of the same group. In the textbooks for the sanitary corps there is a chapter which clarifies the whole subject of blood transfusion. In the schools and courses, sanitary corps officers non commissioned officers and privates should be instructed with regard to blood transfusion under war conditions. In the review course the subject should be repeated. In the schools for men who are exempt from active military service all participants in hospital activities should receive similar instruction. It is also desirable for the school and company doctors to give instruction in the use of the various instruments necessary.

The blood transfusion apparatus of Jube and the method of Bécart are suitable for use under war conditions. The apparatus of Glauhermann is also handy for the direct method. For the indirect methods the author recommends the apparatus of Mercke with the use of sodium citrate solution.

In conclusion he gives a list of the material needed for the battalion dressing station, sanitation company ambulance surgical detachment, and military hospital, and for school and permanent doctors.

(TOLER) PHILIP SHAFER, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE, POSTOPERATIVE TREATMENT

Webster, J P Deforming Scars *Pennsylvania M J*, 1935, 38 929

The prevention and treatment of deforming scars should concern not only plastic surgery but all branches of surgery. The mental, social, and economic effect of a deforming scar must be considered. The patient remembers a surgical experience by the resultant scar and is gratified by an inconspicuous one. Scars may be congenital or acquired. Acquired scars are caused by infection or trauma, including surgery and burns from heat, chemicals, electricity, or irradiation. The degree of deformity depends upon the extent of the injury and infection as well as the location. Normal healing is characterized by contracture often resulting in ectropion of the eyelids or lips or limitation of motion of the extremities.

The surgeon can often reduce scarring to the minimum by placing his incisions in the most favorable direction as indicated by wrinkle lines or the skin tension lines as plotted by Langer in 1861. Scars contrary to skin tension are prone to spread. Lamination of trauma to the minimum in the handling of tissues is important for good healing. Avoidance of tension and early removal of skin sutures reduces scarring. As dark colored foreign material included in a scar later shows up as a bluish mark, all foreign matter must be carefully removed from fresh wounds. Anatomical replacement of injured parts is best, but, if this is impossible, early covering with a pedicled or free graft will limit scarring. Contracture limits motion and retards development. Webster mentions a number of procedures applicable to various conditions, citing especially the treatment of keloid by combined surgery and irradiation.

THOMAS W. STEVENSON, JR., M.D.

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

Lindemann, A., and Hofrath H. The Primary Care of Injuries of the Face in the Region of the Mouth and Jaws (*Die primäre Versorgung der Verletzungen im Mund Kiefer Gesichtsbereich*) *Deutsche Zahnärztliche Zeitschrift*, 1935, p. 932

Primary suture of a wound about the mouth or jaws should be done only during the first few hours and only in exceptional cases as it usually must be opened. In wounds of the mucous membranes conditions are different, and a few temporary sutures may be introduced to hold the parts in place. However, if the maxillary bone has suffered or the accessory nasal sinuses have been opened, this is contraindicated. An injection of tetanus antitoxin should

be given. Hemostasis may require ligation of the afferent artery. If there is danger of obstruction of the respiratory passages by falling back of the tongue, intubation or tracheotomy should be done. In cases of injury of the esophagus, an esophageal or nasal sound should be introduced for feeding.

Primary orthopedic care of the mandible. For the posteriorly displaced middle piece, Hauptmeyer's method should be used. A spring wire bow or wire sling is attached to a cap on the head of the injured person (extension bow), and the middle piece is grasped by a dentally applied lateral ligature. When the mandible is edentulous, a bone hook in the form of the Bruhn extension hook is introduced into the chin portion from below backward, through an incision in the skin fold of the chin. If a sufficient number of teeth are present in the lateral portions of the jaw, a modification of the Sauer temporary dressing is used. A strong wire bow is fastened to the lateral portions. Then the dentate middle piece of the mandible is fastened to the tractor by wire loops. In this way the backward dislocation is relieved, but not the vertical dislocation. The latter is gradually corrected later by means of rubber bands attached to a similar dental splint on the upper jaw. Extra oral dressings such as chin bandages and circular dressings around the head are contraindicated as they do not prevent dislocation.

The upper jaw. When the mandible is uninjured and contains teeth, the treatment of complete fractures of the maxilla presents few difficulties. Wire bows are used also for these. The pressure pieces are then "articulated" by the bite. Later, intermaxillary rubber bands may be used. A chin bandage is of aid.

Simultaneous fracture of the upper and lower jaws. The authors use a head cap (made by themselves) of soft leather or firmly woven material. For the attachment of the rubber bands small books or patent pants buttons are sewed in at the sides. In the preparation of the upper jaw dressing a long piece of the described book wire is first bent to lie directly along the teeth and then turned back in the region of the last molar and, as in its further course it lies along the first wire bow or the row of teeth, respectively, it is led out at the angle of the mouth. The two outer wire bows should extend posteriorly to about the ear and run about parallel with the plane of the bite. By means of thin ligature wire the splint is tied to the teeth and, if possible, to all of the teeth of the maxilla. By means of the book wire the fragments of the mandible, all large pieces separately, are splinted in the manner described. Then, rubber rings between the maxilla and mandible and stronger rubber bands are stretched from the outer wire bow of the maxillary splint to the

head dressing. The usual circular bandages for support of the soft parts which have been separated from their attachments should be abandoned for aluminum pad dressings. The latter permit cleansing of the wound and open wound treatment. They also take the place of skin sutures. The pliable pads should be from 0.5 to 0.75 mm in thickness covered with gauze and supplied with bands. Possibly two pads may be required. They may be applied also within the oral cavity as shields for the oral bow.

The splints, dressings, and instruments are shown in illustrations. The complete set of instruments for an army surgeon consists of ligature wire, splint wire with small hooks 2.5 mm thick, a ring with screw cannulas, tin shears, wire shears, a small forceps for bending the bows, a punch, and for some cases, a small soldering iron with petrol, a gridle band, rubber bands and rubber strips.

(FRANZ) LOUIS NEUWALT M.D.

Redwitz E. von. *The Treatment of Accidental Injuries and Its Scientific and Clinical Bases* (Die Behandlung der Gelegenheitswunde und ihre wissenschaftlichen und klinischen Grundlagen). *Med. Wkft.* 1935 pp. 555-640.

In defining primary infection the author supports the view of Laeven that the transference of bacteria from the neighboring skin and the clothing immediately after the occurrence of a wound and also secondary infection produced by bandages touching with the bands and contact by the probe must be taken into consideration. The part played by the latter in the pre-antiseptic period is shown by the mortality of from 38.6 to 71.4 per cent.

Accidental injuries are always infected primarily usually with a mixed infection. This is true also of war time gunshot wounds. Laeven, Schoene and Hanusa found that of 70 fresh gunshot wounds 67 contained bacteria. The number and virulence of the bacteria play as important a part in infection as the resistance of the injured person and the character of the wound. Cultivated bacteria always have a more severe effect (injuries to physicians' pitchfork injuries) as was demonstrated by the experiments of Schimmelbusch and Friedrichs. A period of eight hours is too short for primary excision of the wound, especially in injuries sustained in the coal mining regions (Magnus). The teachings and development of war surgery are presented with historical data (Ambrose Pare, Carver, Cester, Piroff, von Es, March, and von Bergmann).

The dictum of von Bergmann that routine treatment must be given first place in the field seems to have been completely refuted by the world war as the numerous infantry wounds and the predominant severe grenade injuries produced entirely different wounds. However, von Bergmann did not ask routine treatment for these but demanded it for the large caliber wounds produced by infantry bullets and shrapnel balls. And for these, the von Bergmann routine technique is still correct since the world war.

The world war and postwar experience have taught that operative debridement without abortive chemical treatment of the wound may yield very good results. For example, Felsenreich obtained successful results in from 96 to 98.7 per cent of 2,000 accidental wounds. Therefore in war light antiseptics was not rejected (Carrel, Dakin fluid and many other remedies).

Next to tincture of iodine and iodine chloroxy-chinolin, von Redwitz found that hypochlorite solution in Braun's ampoules was most satisfactory when it, too, was used the first six to eight hours. Clairmont also, cuts around the infected wound and follows this procedure by chemical disinfection with a 5 per cent iodine alcohol solution and primary suture. He achieved primary healing in 90 per cent of wounds on the head and from 50 to 60 per cent of wounds on the extremities. For the present deep antiseptics may be considered a failure. Whether electrosurgical treatment of wounds has any advantages over cutting with the knife or scissors is still a moot question as regards disinfection by excision. Routine treatment must also be further developed under the changed conditions of war surgery as this is the basis of the great educational value of von Bergmann's teaching. Tetanus prophylaxis must be administered with discrimination. Judgment regarding the polyvalent antitoxic, prophylactic anaerobic serum is as yet impossible. Axhausen's rules for the treatment of wounds are praised. Von Redwitz concludes that after emergency bandaging the wounded must be placed under the care of the surgeon. Nothing would be more unfortunate than for the freedom of individualization in wound treatment to result in the polypragmasia of the unauthorized.

(FRANZ) LOUIS NEUWALT M.D.

Wilson W. C. *Extensive Burns and Scalds*. Edinburgh M. J. 1935 42: 177.

The author divides the clinical course of an extensive burn into the following five stages: (1) initial shock, (2) secondary shock, (3) acute toxemia, (4) septic toxemia, and (5) healing. It should be remembered that the course is variable; that the distinctive features of any of the first four stages may be absent and that the stages may overlap.

It is important to differentiate between initial and secondary shock of burns. Initial shock tends to disappear spontaneously and is rarely serious. Secondary shock is a progressive and dangerous condition which requires active treatment. Effective treatment is available. Acute toxemia of burns is not caused by concentration of the blood fluid loss; early bacterial infection, chemical changes in the blood, or a combination of these factors. Evidence has been brought forward in favor of the view that it is the result of the action of circulating toxins which have been formed at and absorbed from the burned area. The main action of the toxins is on the liver cells. Toxin formation in burned tissues is accelerated and augmented if micro-organisms are present. The suggestion is made that organisms may

produce non specific toxins from devitalized tissues. There is evidence that toxin formation occurs in tissues which have been devitalized by injury other than heat, such as trauma.

The author uses a 20 per cent solution of tannic acid in the treatment of the wound, applying it in one dressing. He advocates the addition of an antiseptic such as acriflavine (1:1,000) to the tannic acid solution or the use of 1 per cent gentian violet immediately after the application of the tannic acid. He states that there is much to be said in favor of a specially equipped "burn ward" with a staff trained in the nursing of cases of burns.

STANLEY J SEEGER, M D

Meyer, G. A Critical Discussion of Methods of Treating Furuncles from the Theoretical Point of View (*Kritik der Furunkelbehandlungsmethoden vom theoretischen Standpunkt aus*) *Beitr z klin Chir*, 1935, 162: 163.

After briefly reviewing the vital processes in normal connective tissue and connective tissue attacked by living foreign bodies as revealed by the findings of recent investigations, Meyer discusses the processes occurring in the tissues in the presence of a furuncle, staphylococcosis of the corium. He states that subcutaneous healing of a neglected furuncle is very rare. As can be determined from a study of sections, the healing is brought about by foci of resistance to the advance of the necrosis except in the direction of the nearest surface point. Toward the surface the necrosis advances unhindered to the unprotected epithelium, where it soon terminates in expulsion and healing.

Meyer next discusses critically the methods of treating furuncles. These are (1) percutaneous treatment from the surface, (2) treatment through the surrounding tissues without exposure of the furuncle, and (3) incision into the furuncle.

Surface chemotherapy in all its forms (poultices, packs), applications of cold and heat, and the Wassermann local percutaneous treatment with staphylococcal extracts have rendered it doubtful that furuncles can be influenced through the intact surface. Moreover, theoretical bases for this type of treatment are lacking.

First among methods of treatment which attack the focus subcutaneously is Bier's hyperemia. However, this has not weakened the considerable theoretical doubts regarding these methods. D'Herelle's bacteriophage also appears not to have fulfilled the promises made for it. Deep roentgen irradiation can, of course, exert an effect on the tissues without injury of the skin. However it is certain that the process of nuclear segmentation which is essential for cell multiplication is disturbed or prevented by the roentgen rays. This is true especially of the formation of mitotic figures, which plays a rôle in the protective struggle of the connective tissue. Therefore, this treatment may possibly do much more harm than good, especially in furunculosis when an unfavorable situation such as the lips or

face. The Laeven injection of autogenous blood represents an attempt to wall off the furuncle with blood cells while leaving the skin practically intact. However, this procedure is rendered dangerous not only by the dead erythrocytes which act as a culture medium, but also, and to a greater degree, by the demand made on the protective cells to remove the dead cells which have become foreign bodies. Moreover, from the theoretical standpoint, the faulty preservation of the tissues surrounding the furuncle and their veins in the technique recommended by Laeven must be characterized as obsolete.

Surgical treatment has the advantage over all other methods in that it attacks the evil at the root. However, this is done only when a methodical attempt is made to render the toxin secreting coccal focus harmless as quickly as possible. This is accomplished with certainty only when, under guidance of the eye, the grayish-white induration, which reveals the necrosis, is opened and, without unnecessary injury of the surrounding tissues, is removed or sectioned. The essential of the minor procedure is immediate diversion of the fluid stream carrying the toxins and bacteria. Working in the "normal" or protective zone is basically incorrect. This old method has been "improved" with doubtful success. Destruction of the coccal focus with the galvanocautery and the older cauterization methods produce deep necroses and do not assure sufficient drainage.

Riedel's incision which undermines the furuncle and attacks it from below and the tip incisions have not proved successful.

Meyer emphasizes a rule that must be observed especially in the treatment of furuncles of the lips—namely, that pressure and roughness must be avoided both in making the incision and in the infiltration of the anesthetic. Drainage may be established with cambric, but not with gauze.

Of the objections against early operation, the only one worthy of consideration is that a furuncle which throws antigens into the blood stream renders the body immune to the staphylococcus for a certain length of time. However, the findings of the investigations of Aschoff and Klinge have proved that nodules in the heart, joints, and elsewhere often have their origin in multiple furuncle formations.

Meyer regards early operation as the only correct treatment, and believes that general treatment is superfluous. (DUMONT) CLARENCE C REED, M D

Blomberg, H von, and Forster, S von. The Treatment of Septic Diseases by Artificial Abscess (*Ueber die Behandlung septischer Krankheiten mit dem kuenstlichen Abscess*) *Muenchen med Wchnschr*, 1935, 1: 783.

So long as it is not possible to obtain differential indications for the method of treatment of septic diseases and to apply specific therapy, non specific treatment must be given the preference, and the artificial abscess best fulfills these requirements.

A strictly subcutaneous injection of from 1 to 2.5 ccm of sterile oleum terbinthina is made on the

lateral aspect of the thigh. The strength of the desired reaction is often in direct relation to the dose injected, not less than 1 ccm and, in cases with poor reacting capacity, as much as 3 ccm may be given. The irritating substance gives rise to the formation of an area of breaking down which is often rather large and usually after from two to three days a doughy softening occurs. However the opening of the abscess should be delayed until the elevated leucocyte count in the blood has started to fall, which will be usually on the tenth day. The abscess is opened by a puncture incision in the lateral lower border. The wound should be well drained and left open till healing from within has taken place. If the abscess has developed well, the temperature starts to fall by lysis immediately and in about four days reaches normal. If on the other hand there has been no important rise of temperature before hand the fever curve rises steeply for three or four days.

At first this turpentine abscess was employed only as the last remaining possibility in cases that appeared already unfavorable. The abscess was successful in septic infections in which an accompanying parenchymatous injury to the liver and kidneys contra indicated intensive chemotherapy. Good curative effects were obtained also in severe infections originating in the throat, even when metastatic suppurative foci had already appeared in distant parts of the body. Healing was obtained with the turpentine abscess in a case of agranulocytosis. In a number of cases the turpentine abscess was used too late but there was no objective aggravation of the condition because of the establishment of the turpentine abscess. In viridans infection and in severe endocarditis no benefit was obtained from the turpentine abscess even when it was established sufficiently early and developed satisfactorily. Likewise, in two cases of lymphatic leukemia the procedure was unavailing.

The prognosis could be judged according to whether and how the artificial abscess developed. If it developed well the method was always a success. There were twenty seven cases. Three of the patients died and in none of these did the abscess develop. Of the remainder twenty three were cured or greatly improved. The leucocyte curve showed a typical reaction. If the abscess ran a proper course there was an immediate marked increase in leucocytes which ceased after three days with a simultaneous diminution of the shift to the left and of the granulocytes and an increase of lymphocytes. The subjective improvement was rapid and set in often as early as the second or third day. The patient feels very hungry. It is clear that the normal defense functions are powerfully stimulated. The pus obtained from the mature abscess always consisted of leucocytes and their debris. The number of macrophages was increased in every case. In patients with diseases of the blood, the histiocytic elements predominated in the abscess pus. If the abscess acts favorably on the disease in the usual forms of sepsis

the pus is creamy and yellow. If the abscess does not develop well, in blood diseases and in endocarditis lenta, the pus is thin, slummy and green. An infection of the turpentine abscess with the organisms of the existing sepsis was never observed. In patients with phlegmons, a severe suppurative reaction occurred, after the development of a turpentine abscess, in the wounds which had been secreting a turbid ichorous fluid. The cellular defense functions, as well as the humoral properties, are enormously increased by the artificial abscess.

A cautiously dosed blood transfusion in combination with the induction of a turpentine abscess was a favored method of treatment. The abscess provides valuable protection against recurrence. Injections of purified turpentine preparations, such as olohinthin, cannot take the place of the abscess in severe cases. Sensitivity to turpentine is rare. It may also be possible that the turpentine itself plays a part in the healing of septic processes.

(ERICH HEIMPEL) FLORENCE ANVAN CARPENTER.

Gage M, and DeBaKey, M. Tetanus and Its Treatment. *Am J Surg*, 1935 30 157

Gage and DeBaKey state that the mortality of tetanus today is only slightly lower than the mortality of the condition in the pre antitoxin era.

The incidence of tetanus is inversely proportionate to the degree of prophylaxis instituted. With regard to the etiology and pathogenesis of the disease the authors call attention to the occurrence of the tetanus bacillus in manured soil, the gastro-intestinal tracts of animals and woolen clothing. They state that tetanus most frequently follows puncture wounds as wounds of this type furnish the requisites for growth of the organism, namely, devitalization of tissue, anaerobic conditions, the presence of a foreign body and the introduction of pyogenic bacteria which bear a symbiotic relationship to the tetanus bacillus. They believe that the length of the incubation period depends upon whether spores or living bacteria were introduced into the wound. The tetanus bacillus remains in the wound and its exotoxins are absorbed by the lymphatics. From the lymphatics they enter the general circulation and are carried to the neuromuscular endplates where they ascend the motor nerves to the cord and the brain. Pathologically, there are no specific lesions.

The prognosis probably depends upon the incubation period, the virulence of the organism, whether toxin free spores or vegetative forms are present, the severity of concomitant pyogenic infection, the number and severity of the convulsions, the time at which active treatment is begun and the presence or absence of antitoxin in the blood.

The authors emphasize the importance of intelligent prophylactic care. As treatment they advise careful debridement of the wound under regional or general anesthesia. They caution against the use of local infiltration and any form of cautery. They believe that the first dose of antitoxin should be given at the time of the operation. They usually

give 60,000 units of antitoxin intravenously and 20,000 to 40,000 units intramuscularly at the time of the patient's admission to the hospital and then daily doses of from 10,000 to 20,000 units depending on the reaction and the severity of the condition. The intrathecal route is not used.

They review the various drugs that have been employed, but believe that avertin is the drug of choice and its administration should be repeated as often as necessary. Fluids and food can be administered easily with a duodenal tube. The fluid intake should be from 3,000 to 4,000 ccm daily. The authors use transfusions frequently, especially transfusions of unmodified blood.

They report fifteen in which there were three deaths.

HARVEY S. ALLEN, M.D.

Clarenz F. M. A Study of Forty Cases of Tetanus at the Surgical Clinic of the University at Giessen, with a Contribution to the Subject of the Changes in the Spinal Column Following Tetanus and a Statistical Study of the Deaths from Tetanus in the Province of Oberhessen in the Period from 1923 to 1932 (Beobachtungen ueber 40 Faelle von Tetanus aus der chirurgischen Universitaetsklinik zu Giessen nebst Beitrag zur Frage der Wirbelsauelevaeranderungen im Anschluss an Wundstarrkrampf und einer Statistik der Tetanusdesfaelle der Provinz Oberhessen von 1923-1932). 1935 Giessen, Dissertation.

The author first discusses in great detail the unequal geographical distribution of tetanus. Although it may be concluded that the geological formation and the character of weathering and decay does not have very definite significance, nevertheless, the author believes that it would be a meritorious although enormous task if an extensive study of the soil of the whole of Germany be made. This could be done in cooperation with the German Geological Institute, and the results brought together into a general statistical compilation. Of greater importance in the distribution of tetanus are the geographical conditions resulting from the meteorological influence (sunshine, the temperature of the air, humidity) and, of course, the density of population must also be considered. The author points out the fact that in workers employed close to the soil tetanus bacilli are found in the stools in from 39 to 40 per cent, while in the rest of the population they are present in only from 5 to 6 per cent. In spite of the progress in hygiene, prophylaxis, and antiseptics, the Madelung statistics for the world war show that the cases of tetanus amounted to 0.66 per cent, and the increase to 1 per cent toward the end of the war was apparently caused by slackening of the care in the prophylaxis (Berard, Sonntag).

Reports of tetanus following operations are not rare. In this connection the author cites two case histories from the surgical clinic at Giessen. Since attacks of tetanus following aseptic operations on the foot are possibly caused by foci of tetanus spores within the skin of the sole, prophylactic serum injection is to be recommended in every case of this kind.

(Stoebel, Koenigswinter). Buzello goes even further than this and recommends the injection of prophylactic serum before all operations on the intestine. According to these statistics there should be an increased incidence of tetanus in those employed close to the soil. Experience at the clinic in Giessen substantiates this. Also, in the cases of tetanus following machine injuries the machines have never been found to be "soil sterile." Clean machine injuries are seldom the cause of tetanus. In every case of injury inquiries must be made as to the patient's actions after he was injured.

Although the neglect of prophylactic serum injection for tetanus has been regarded as malpractice, the author states that today the opinion is held that even prophylactic injections have rigidly delimited indications. The chief indication for prophylaxis is the relative frequency of the affection in the geographic district where the accident occurs (Loewe, *Med. Welt*, 1932, No. 51). The most dangerous lesions are the small and insignificant lacerations which are not heeded as a rule, and then come too late with fully developed symptoms under the care of the physician. The author recommends that the population be educated with regard to this disease. In relation to the use of antitoxins, permanent immunity by means of vaccination, he cites the work of Zoeller.

The shorter the period of incubation, the more severe the course of the disease will be found and the poorer its prognosis. For the first, second, and third weeks after trauma, statistics of the Strassburger Lazaret (Kuemmel-Madelung) show a mortality of respectively 90, 50, and 32 per cent. The corresponding figures for the clinic at Giessen are 92.3, 76.9, and 14.3 per cent. Although treatment with serum after tetanus has developed does not promise very much, yet it should not be generally discarded (Buzello, *Zentralbl. f. Chir.*, 1923, 1928, and 1929). The good results of Laeven in the treatment of tetanus with avertin narcosis are well known. In the clinic at Giessen a lowered mortality after the introduction of avertin narcosis was not observed. Treatment with magnesium sulphate and other media has been tried with varying success. It is doubtful if larger amputations would help any. In discussing the changes in the spinal column following tetanus, the author cites the work of Zuckschwerdt and Axtmann (*Deutsche Ztschr. f. Chir.*) and reports six case histories from the clinic at Giessen. The spinal column findings were abnormal in all of the cases.

(GERLACH) JOHN W. BRENNAN, M.D.

Ghormley, R. K. Gas Gangrene and Gas Infections. *J. Bone & Joint Surg.*, 1935, 17, 907.

The diagnosis of gas infections must depend not only on the physician's sense of judgment of clinical findings, but on the laboratory aids as well. In the order of their importance, these diagnostic aids would be about as follows: pain, swelling, elevation of the pulse rate, bacteriological findings, discoloration, the presence of crepitus in the tissues or of gas

in the exudate (not constant), a bad odor, which is said to be characteristic, but is not constant, elevation of the temperature, and the presence of gas bubbles in the roentgenogram of the affected part.

Ghormley would divide the treatment into four phases as follows (1) recognition, (2) serum therapy, (3) surgery, and (4) dressings.

The first thing once the diagnosis is established is to give gas gangrene antitoxin in therapeutic doses. For the most effective administration the intravenous method is best for reaching the affected tissues. In Ghormley's cases an average of two doses was given in each case, and in many instances the intravenous dose was followed in a few hours by an intramuscular dose. It is questionable how many doses are necessary.

The total results indicate a mortality of 42.5 per cent. This is somewhat below the percentage in the World War. Excluding the group of patients with abdominal involvement, most of whom were hopelessly ill and with four of whom the condition was not diagnosed as such but was recognized at necropsy the percentage who recovered on use of the antitoxin is high. Others have reported similar results with the use of antitoxin. In general it may be said that, with recognition of the condition and a judicious combination of the use of antitoxin and surgery, a mortality of approximately 15 per cent may be expected.

As far as the prophylactic use of the antitoxin is concerned there is little opportunity to give any worth while figures as yet. In the present series one patient had only prophylactic doses of antitoxin and it was felt that the infection was much mitigated by use of the antitoxin.

The author concludes that gas gangrene and gas infections must be diagnosed early if good results are to be obtained. The multiplicity of anaerobic organisms with variation in the clinical picture must be remembered. With the judicious use of polyvalent gas gangrene antitoxin and surgery the mortality in such cases should be reduced to approximately 15 per cent.

ANESTHESIA

Tovell R. M. Methods of Producing Anesthesia for Operations on the Neck. *Surg Clin North Am* 1935 15 1277

For many operations on the neck regional anesthesia is satisfactory. Certain conditions may contraindicate the use of regional methods, for instance during the final stage of excision of a thyroglossal duct cyst it is frequently necessary for the surgeon to insert his finger into the patient's mouth in order to identify structures at the base of the tongue. A conscious patient does not tolerate this maneuver well. In cases in which the duration of operation is long and the patient is likely to become restless general anesthesia is indicated.

If inhalation anesthesia is decided on it is essential to employ a method of administration that will

provide an adequate airway and at the same time insure against encroachment on the operative field by the anesthetist. Except for short and minor procedures in which the face mask does not interfere with the surgeon, intratracheal anesthesia best meets these requirements. In this method, by bringing the anesthetic agent directly to the large bronchi and by drawing out the expired gases that part of the 'dead space' represented by the mouth, pharynx, larynx and trachea is eliminated. Close contact of mixtures ordinarily irritating to the mucous membranes of the same structures is not permitted and the production of mucus is minimal. Invasion of the trachea by infectious foreign material from the pharynx may be prevented. The method permits constant control of the depth of anesthesia. The surgical stage can be maintained with minimal amounts of ether, nitrous oxide, ethylene, or cyclopropane and encroachment on the field of operation need not occur. For operations on the spinal cord the method is particularly warranted because the prone position makes aeration difficult under other methods of general anesthesia. The method is to be preferred to the regional method because the patient is protected against painful stimuli produced when the posterior roots are disturbed. The intratracheal method is applicable to radical gland dissections or the removal of a thyroglossal duct cyst. Removal of a mixed tumor of the parotid gland may be accomplished satisfactorily when the patient is anesthetized by the intratracheal method.

'Paravertebral block' is a term applied to a method in which anesthesia is produced by distributing the anesthetic solution close to the vertebral column, in the region at which the nerves emerge from the intervertebral foramina. The needles through which the fluid is injected may be inserted through the structures of the neck lying lateral to the transverse processes or through those lying posterior to the transverse processes. The lateral route is employed when the operative procedure is to involve anterior or lateral structures of the neck and the posterior route is employed for such operations as laminectomy.

For the cervical block the patient lies with his face downward, his chest supported on pillows and his head bent forward until his forehead touches the table. A wheel is raised 2 cm. lateral to the median line on either side opposite the spine of the second cervical vertebra. Intracutaneous injection is continued from the points on either side of the median line as far as it may be necessary to block. An 80-mm needle is introduced through the wheel first raised and inserted anteriorly and laterally until the point impinges on the lateral aspect of the vertebra. The needle is then withdrawn until its point is in subcutaneous tissue. It is then re-introduced a little more obliquely and inserted 1 cm. beyond the point where the needle was last felt gliding along the lateral aspect of the vertebral arch. 1 cc. of a 1 per cent solution is injected, care being taken that the deposit is not made intravenously. This pro-

cedure is repeated on the opposite side. When all the needles are in place the anesthetist is confronted with two lines of needles, the shafts of which cross the median line. The needles may then all be withdrawn and the space between each two points of insertion connected with the one above and below by the injection of a 0.5 per cent procaine epinephrine solution. The injection is both dermal and subcutaneous, and is carried down to the level of the transverse processes. A similar injection is made to join the wheals opposite the spine of the second cervical vertebra. If the infiltration has been done with cold solution, the duration of anesthesia will be sufficient for an exploratory laminectomy or the insertion of a bone graft.

For deep cervical block by the lateral route the patient lies on his back on the table and his head, well turned toward the side, is supported by one thin pillow. The tip of the mastoid process is palpated and a wheal raised a finger's breadth below it and near the posterior border of the sternocleidomastoid muscle. Next, the external jugular vein is compressed at a point just above the clavicle. The vein is made to stand out in this way and the point at which it crosses the posterior border of the sternocleidomastoid muscle is noted. A second wheal is raised 1 cm posterior and 1 cm cephalad to this point. The upper wheal represents the point of insertion through which the second cervical nerve may be blocked. The needle used to block the fourth cervical nerve is inserted through the lower wheal. In order to block the third cervical nerve a needle is inserted through a wheal raised midway between the two. When the anesthetist injects the right side he stands at the head of the table and when he injects the left side he frequently moves so that he stands facing the left side of the neck. An 80-mm needle is inserted through the upper wheal. At the same time the forefinger of the hand which is not holding the syringe is used to palpate the tip of the transverse process of the sixth cervical vertebra, which is usually prominent. The needle is directed downward, inward, and backward until bone is encountered. It must be remembered that the tips of the transverse processes lie near the skin. Because of danger of entering the spinal canal the needle must never be inserted directly inward. It is an aid to aim the needle in the direction of the finger which is palpating the tip of the transverse process of the sixth cervical vertebra. Fifty-millimeter needles are inserted through the second and third wheals, and the bony landmark is encountered if the same general method of search is employed. Through each of the three needles to a cm of a 1 per cent procaine epinephrine solution is injected in divided doses after aspiration for blood and spinal fluid has been carried out.

Superficial cervical block constitutes the second line of defense in the induction of anesthesia for any major surgical procedure on the neck. Twenty cubic centimeters of a 0.5 per cent procaine epinephrine solution are used and should be injected subcu-

taneously and subfascially over the sternocleidomastoid muscle.

To complete the establishment of regional anesthesia, it may be necessary, for certain operations, to infiltrate certain areas. Thus, if the submental and submaxillary glands are to be removed, it is necessary to infiltrate a 0.5 per cent procaine epinephrine solution along the angle of the jaw and to inject the floor of the mouth in several areas, 5 cm of a 0.5 per cent solution being injected with each thrust.

For laryngectomy or thyrotomy it is necessary to block the superior laryngeal nerves and infiltrate on either side of the line of incision. To block a superior laryngeal nerve the interval between the hyoid bone and the thyroid cartilage is found. A needle 50 mm in length is thrust through the skin over this area to a depth of 1 cm. Five cubic centimeters of 1 per cent procaine epinephrine solution are injected slowly, and then a similar injection is made on the opposite side. If a stoma has been made previously by tracheotomy, this injection is without danger, but if a tracheal stoma is not present the needle may be thrust too deeply and the point becomes submucosal. Injection of solution in this situation may produce an edematous bleb within the larynx, converting a partial obstruction into a complete one. If, during the injection, the patient complains of difficulty in breathing or has an attack of coughing it is well to discontinue the injection and partially to withdraw the needle before beginning the injection again. To complete the block for laryngectomy and to provide anesthesia of sufficient duration, it is necessary to infiltrate intradermally with a cool 0.5 per cent procaine epinephrine solution at a point in the median line near the tip of the chin and from that point along lines which diverge, either side of the median line, until the wings of the thyroid cartilage are reached. From the wings of the thyroid cartilage, infiltration extends downward, on either side of the median line until the medial ends of the clavicles are met. Following this type of preparation the larynx may be removed without causing undue pain. It is necessary for the surgeon to infiltrate the tissue between the larynx and esophagus in order to desensitize twigs from the vagus nerves. Ten cubic centimeters of a 0.5 per cent procaine epinephrine solution on each side are sufficient for this purpose. Unilateral deep and superficial blocks are particularly useful for the excision of a diverticulum of the esophagus or for the ligation of an external carotid artery, preliminary, for example, to destruction of an extensive lesion of the tongue by diathermy. For these operations, involving one side only, infiltration of the median line is advised in order to establish a definite line of demarcation between anesthetized and sensitive regions. For the excision of cervical lymph nodes or for tracheotomy, anesthesia may be produced by field block or infiltration.

For operations on the thyroid gland it is seldom necessary to employ complicated methods of blocking to obtain anesthesia. Bilateral superficial

cervical block is produced by infiltrating the subcutaneous tissues over the sternocleidomastoid muscle on each side with 10 c cm of a 1 per cent procaine solution. Epinephrine is omitted. The skin and subcutaneous tissue in the line of incision and in the region of the flap that is to be raised are infiltrated. From 60 to 80 c cm of a 0.5 per cent solution of procaine is usually sufficient. Bartlett and Bartlett have advised blocking the descendens hypoglossi nerves which supply the ribbon muscles. This may be done by injecting subcutaneously 5 c cm of a 1 per cent solution of procaine immediately anterior to the anterior border of each sternocleidomastoid muscle, at its midpoint. With this type of injection it is usually necessary for the surgeon to infiltrate the region of the superior pole of the thyroid gland as it is approached. The alternative method is to give the patient 'gas' during the short interval of intervention in this region. Provided adequate preliminary medication has been administered, a high concentration of oxygen in the mixture may be maintained without interfering with the character of the inhalation anesthesia.

Rowbotham S. Cyclopropane Anesthesia. A Report Based on 250 Cases. *Lancet* 1935 229 1110

Cyclopropane is a gas which is heavier than air, insoluble in water and very soluble in lipoids. In mixtures with air or oxygen in the proportions employed for anesthesia it is explosive. Hence its use with the cautery or for diathermy is definitely contraindicated. It has a pungent smell but is non-irritating in low concentrations.

Rowbotham reports its use in the cases of 250 patients. In most cases he gave premedication with 1/30 gr of omnopon per 14 lb of body weight, but occasionally administered nembutal or evipan intravenously. The carbon dioxide absorption technique was employed but usually not until after induction in order to obtain the benefits of increased respiration. As a rule use was made of a simple apparatus consisting of a well fitting mask with Clausen's harness, a 1 gal rebreathing bag into which soda lime was put when necessary, and 2 glass flow meters which were especially graduated to measure up to 1 liter of gas in multiples of 50 c cm. The bag was filled with oxygen, the face piece firmly applied and the cyclopropane then run in at the rate of 250 c cm per minute. In one minute the rate was

increased to 500 c cm or more, as needed. The oxygen flow was then adjusted to about 250 c cm per minute, and in from one to five minutes the cyclopropane flow could be completely stopped. Occasionally full muscular relaxation was not obtained until respiration failed. It was then customary to intubate the patient and squeeze the bag. When this was done the deeper planes of anesthesia were easily obtained and the patient remained fit so long as the artificial respiration was kept up. Once relaxation was attained, the mixture could be weakened by the addition of oxygen. After anesthesia was reached, the addition of cyclopropane to the mixture was necessary only occasionally.

Induction was remarkably quiet. There was no excitement, coughing or laryngeal spasm and respiration was not increased. The usually marked shallowness of the respiration may perplex the anesthetist who is accustomed to correlating the depth of respiration with the degree of anesthesia. Otherwise the signs of anesthesia were the same as those seen with the use of other general anesthetics. A rise in the blood pressure of 10, 20 or 30 mm Hg or more was usually noted and varied directly with the concentration of the cyclopropane. Capillary bleeding was more marked than with the use of other anesthetics. As a rule the rate of the pulse neither rose nor fell but in a few poor risks arrhythmias developed. Except in cases in which heavy premedication was given, muscular relaxation occurred early and was very complete, perhaps because of the full oxygenation of the muscles.

When an excessive amount of cyclopropane is used, anesthesia is induced extremely rapidly and the fourth stage may develop after a few breaths. Therefore great care must be taken to control the flow of gas carefully. After the lightest anesthesia the patients regained consciousness as soon as they would have regained it after nitrous oxide anesthesia but after high laparotomies the return of consciousness was slow. Nausea and vomiting were less marked than after the use of ether but more marked than after the use of nitrous oxide and oxygen.

Rowbotham concludes that cyclopropane is useful chiefly for the induction of deep anesthesia and for temporarily fortifying nitrous oxide and oxygen. He sees no reason for using it to replace nitrous oxide and oxygen when only light anesthesia is required.

ELIZABETH CRANSTON

PHYSICO-CHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Kimm, H. T., Spies, J. W., and Wolfe, J. J. Sialography, with Particular Reference to Neoplastic Diseases. *Am J Roentgenol*, 1935, 34, 289

In the available literature the authors found only nine cases in which the roentgenographic visualization of the ducts, ductules, and parenchyma of the salivary glands was used as an aid in the diagnosis of neoplastic disease. They review these cases briefly and report eighteen others.

In the available cases the technique employed consisted of the injection of lipiodol into the ducts with a 2 c cm Luer glass syringe and a cannula made from an ordinary steel needle, followed immediately by the making of stereoscopic roentgenograms. Slight discomfort resulted from the injection, but ceased within a few hours. As a rule from 10 to 15 c cm of lipiodol was sufficient for the parotid duct and from 5 to 0.75 c cm for the submaxillary duct.

The cases are divided into two groups. Group 1 included seven cases in which there was sialographic evidence of involvement of the salivary gland—five cases of mixed tumor of the parotid, one case of adenocarcinoma of the parotid, and one case of adenocarcinoma of the submaxillary gland. In these cases the tumor was observed to invade the gland. In five cases this finding was confirmed by surgical and pathological examination.

Group 2 included eleven cases of tumors without evidence of involvement of the salivary gland. The tumors included cysts, branchioma, carcinoma, and enlarged lymphatic glands.

The authors believe that sialography is a helpful but not infallible diagnostic procedure. It was not possible to differentiate definitely between a benign and malignant lesion involving the salivary gland.

EARL E. BARTH, M.D.

Picchio, C. A Critical Discussion of the Roentgenographic Anatomy and Roentgenological Symptomatology of the Neck. (*Appunti critici di anatomia radiografica e di semiologia radiologica del collo*). *Radiol med*, 1935, 22, 381.

Picchio reviews the radiology of the neck in the normal subject and in various pathological conditions, discussing chiefly controversial points. The boundaries between normal and abnormal are not well defined. On the one hand there is a tendency to neglect valuable diagnostic signs and on the other, to interpret appearances sometimes found in normal individuals as abnormal.

The author's observations are based both on clinical cases and anatomical preparations. The first part of the article is devoted to the skeleton and the second part to the soft tissues. Picchio empha-

sizes the great variability of ossification in different individuals with regard to time of appearance, extent and structure of the bone, and the islands of compact substance which may appear in any of the cartilages, also the difficulties in judging the influence of constitutional and general pathological conditions on the skeletal apparatus. Because of superposition of the soft parts, exact information as to ossification is not always obtainable *in vivo*. Even in anatomical specimens certain structures, such as the arytenoid cartilages, may escape observation. Changes in the cartilages are often simulated by incomplete ossification or may be overlooked. In his roentgenograms of dissections of the normal larynx Picchio found that the appearances of incomplete ossification were identical with descriptions in the literature of cartilaginous absorption. In fact, the importance of roentgen study of the pharyngolaryngeal skeleton is more limited than is generally considered and lies chiefly in demonstrating the great variability of ossification under both normal and pathological conditions.

Diagnostic orientation has now shifted rather to the study of the soft tissues, which always supplements the clinical examination, sometimes permits a more detailed diagnosis, proves invaluable when laryngoscopic examination is technically impossible, and will give an objective record of the course of any lesion. The author discusses in detail the changes in the soft parts and skeleton due to lesions inside or outside of the trachea and their roentgen diagnosis. Infiltrations which may escape laryngoscopic diagnosis because they do not involve the mucosa produce characteristic deformities in the shadows of the soft parts and in the outlines of the trachea. Proliferative and ulcerative lesions are also easy to recognize. The vocal cords are not constantly visible normally, and judgment concerning them should be reserved. The same applies to the ventricles of Morgagni.

The article contains numerous roentgenograms and is followed by a bibliography.

M. E. MORSE, M.D.

Garland, L. H. The Roentgen Treatment of Certain Types of Arthritis. *Radiology*, 1935, 25, 416.

The author reports his experience with roentgen treatment in infectious and degenerative types of arthritis. Its use is justified in these conditions because of the generally recognized beneficial effects of small doses in stimulating localization of inflammatory processes and absorption of the regional exudate and their analgesic effect.

The aim of the treatment was to deliver approximately 10 per cent of a full dose to the affected joint or joints twice a week for two or three weeks. The

dosage in roentgens, measured in air, without back scatter was usually 80 r to each field. The technical factors employed were 200 kvp, 30 ma, filtration with 0.5 mm of copper and 1.0 mm of aluminum lambda effective 0.16 Å, and a distance and field depending upon the depth and the size of the affected joint. Most joints were treated through ventral and dorsal fields, and some through mesial and lateral fields. With the exception of the wrist, hand and foot, most joints received irradiation in two fields on each treatment day. In the seven cases of spinal arthritis only large dorsal fields were treated. As a rule the field was rectangular and measured 20 by 35 cm.

Thirty cases of gonorrheal arthritis with a total involvement of eighty joints were treated. Thirty joints were apparently cured, forty five were benefited and five were not benefited. In five cases of multiple joint involvement one joint was left untreated as a control. In all five cases pain and swelling persisted in the untreated joint while the condition of the treated joint or joints cleared up. The average number of treatments in the 'cured' group was 5.3 in the benefited group 5.8 and in the not benefited group 4.5. The author reports several illustrative cases in detail.

In cases of non gonorrheal arthritis the results were less satisfactory although the method offers possibilities for much benefit if it is employed judiciously. Absence of the immediate and often spectacular relief which occurs in cases of gonorrheal arthritis was conspicuous. Nine cases of acute infectious (unclassified) arthritis with involvement of thirteen joints showed improvement in eight of the joints. Of three patients suffering from chronic infectious arthritis with involvement of ten joints, two became free from symptoms. Of seven patients with chronic hypertrophic (degenerative) arthritis of the spine only one became free from symptoms but four others were benefited.

The author tabulates the cases with regard to age, sex, diagnosis, number of joints involved, dosage in r units, number of treatments and results, and presents tables summarizing the results according to the number of cases and of joints treated.

ADOLPH HARTUNG, M.D.

Pfahler, G. E. A Further Discussion of the Saturation Method of Roentgen Therapy in Deep Seated Malignant Disease. *Am J Roentgenol* 1935 34 629

In the saturation method of roentgen therapy the tissue in the region of the malignant disease is irradiated to the limit of normal tissue tolerance (saturation) by either single or multiple doses and this effect is maintained by additional continuous or fractional irradiation over a period long enough to destroy all of the malignant cells or to arrest their growth.

The principles involved in saturation therapy date from the beginning of roentgen therapy, but their application has undergone considerable change

with improvement in the calculation of dosage and other factors relative to irradiation. At the present time the practical application of these principles consists of the administration of measured divided doses of filtered rays over a period of several weeks. This technique forms the basis of the saturation method used by the author as well as of several other methods notably those recommended by Coutard, Schinz, and Holthausen.

The development of the saturation method is described at length from its introduction by Kingers in 1920 with the use of unfiltered rays in the treatment of skin disease to its adaptation to deep therapy with the use of filtered rays by the author. The saturation dose as built up by the fractional treatment and saturation curves is discussed in detail. The advantages of the method in relation to the varying vulnerability of cells to irradiation during mitosis as demonstrated by others are emphasized. In the treatment of malignancy by irradiation consideration must be given not only to the destruction of the cancer tissue but also to the preservation of the adjacent normal structures. The saturation method is of advantage for both objectives.

In conclusion attention is directed to the following rules for the use of the saturation method:

1. The irradiation must be accurately measured both as to surface and depth dose.

2. The rays must be carefully directed into the diseased tissue and, so far as practical, their passage through important essential organs must be prevented.

3. The distribution of the irradiation in the tissues with each application must be considered. To accomplish the desired distribution the equipment developed by Holfelder is very useful.

4. The cross firing must be done accurately and the total dosage passing through each portal of entry as well as the saturation value must be measured or calculated for each port of entry and for the tumor tissue irradiated.

5. The normal tissues and the health of the organism as a whole must be conserved so far as possible. It is this requirement especially that makes the saturation curves of value as compared with an ordinary set rule of application or the indifferent application of divided doses since in some cases it is possible to give a large dose at the beginning and thus reach the saturation value in the tumor tissue early, while in others especially when the irradiation is done through the large blood vessels or heart it is necessary to give many small doses (because of irradiation sickness from large doses) in order to reach the required value. Moreover, if the treatment is interrupted by a complication, the necessary supplementary dosage to be given can be calculated more accurately from saturation curves than in any other way except perhaps by the most expert.

6. It is desirable to reach 100 per cent of an erythema dose in the tumor tissue as soon as possible without producing irradiation sickness and without

damaging any tissue. In cases of deep seated disease this usually requires from several days to a week.

ADOLPH HARTUNG, M D

MISCELLANEOUS

Bierman, W., and Schwarzschild, M. The Therapeutic Use of Short-Wave Currents. *New England J Med*, 1935, 213 509

An electrical current as it passes through tissue liberates heat. Accompanying the heat, secondary harmful chemical effects may occur within the tissue. The electrical current must therefore be controlled and used in such a manner that it passes through living media in a rapidly changing direction. The type of current employed in diathermy or short wave therapy is the alternating current. The number of alternations per second vary from 1 million (diathermy) to 30 million (short-wave therapy). The range of frequency of an alternating current is best expressed in wave lengths. Since electrical vibrations travel at the rate of 300 meters per second division of this number by the alternations per second of a particular current gives the wave length of that current. If the alternations are 1 million per second, the wave length is 300 meters (diathermy), whereas if the alternations are 30 millions per second, the wave length is 10 meters.

Heat generated in a tissue is directly proportional to the product of the electrical field intensity (voltage) and the conductive current at that point. Its amount is influenced by the size and shape of the electrodes and the medium as well as the electrical constants of the tissue.

The total current consists of the conductive current and the displacement current. Since the electrical field changes its directions many million alternations per second, the current may be at a maximum when the field intensity (voltage) is at a minimum. Such a current, which is in a different phase with the electrical intensity, is known as a "displacement current." The "conductive current" is that component of the total current which is in harmony with the electrical intensity, both reaching their maximal and minimal phases simultaneously. The conversion of electrical energy into heat is dependent on the voltage and conductive current but independent of the displacement current.

The distribution of a conductive current through a medium depends upon the conductivity of the medium for which there is an electrical constant. Conductivity is defined as a measure of the conductive current which would be produced in a medium by a unit of electrical field strength. The distribution of the displacement current depends in turn on the dielectric constant of the medium. The dielectric constant is therefore that amount of displacement current which is produced in a medium by a unit field of electric strength.

Accurate analysis of the distribution of current can be made only in the simplest cases as in the following example. A current of specific magnitude

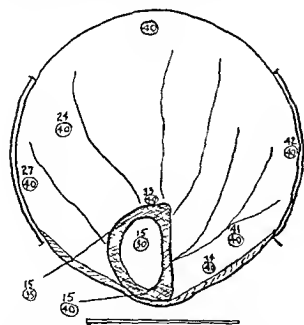


Fig 1 Showing the heating of a bovine thigh in the diathermy and short wave fields. Temperatures in degrees centigrade. Short wave determinations indicated in circles.

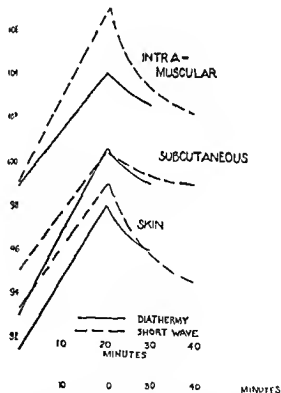


Fig 2 Cutaneous, subcutaneous and intramuscular temperature determinations in the thigh of a living human subject before and after exposure to twenty minutes of diathermy and to twenty minutes of short wave current. Cuff electrode technique. Temperature in degrees Fahrenheit.

passes between electrodes which enclose a mass of tissue consisting of two layers, one fat, the other vascular tissue. It is known that the conductivity of vascular tissue is greater than that of fat. Also that the latter has a lower dielectric constant than vascular tissue. When the alternation frequency is high (short wave) a great part of the current is of the displacement type both in the fatty and vascular tissues. The conductivity of vascular tissue being higher than the conductivity of fat the vascular tissue will become the warmer. However, the frequency can be so regulated so that both tissues can be heated equally. This will be accomplished when the electric field intensity is greater in the fatty tissue to the same degree that the conductive current of the vascular tissue is greater than that in the fat.

Short wave therapy offers advantages over diathermy. Uniform heating of tissues can be obtained. In cases in which specific tissues or organs are to be treated selective heating can be administered without including contiguous structures as in therapy for lungs, cartilage or bone. Fig 1 is a graphic comparison of temperatures after diathermy and short wave therapy to a bovine thigh. It demonstrates the greater uniformity of heat delivered by short wave to all the tissues regardless of the distance from the plates.

Figure 2 represents on a comparative basis the elevations in the temperature of the skin, subcutaneous tissue, and muscle in a patient who received diathermy for twenty minutes in the morning followed by similar short wave treatment in the afternoon. Both treatments were given over the same area. The temperatures were taken by means of thermocouple needles. The graph shows that higher temperatures for a longer time can be obtained by the use of short wave therapy.

The value of short wave therapy cannot be appraised until a larger series of cases is studied. This form of treatment may be used for traumatic and gonorrheal arthritis, myositis, myofascitis sprains and traumatic tenosynovitis. It may be employed also as an adjunct in the treatment of carbuncles, axillary abscesses, hand infections, and cervical gland infections before and after surgical drainage.

Short wave therapy should be given carefully. Burns and overheating of tissue must be guarded against by proper regulation of the current. There should be no clothing or metal object between the treated area and the plates. Though there are a great many short wave machines on the market, the physician purchaser can obtain a useful machine best by selecting one approved by the Council on Physical Therapy of the American Medical Association.

BENJAMIN G. P. SHATSKOFF, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Barraquer-Ferré, L. Progressive Lipodystrophy, the Barraquer-Simon Syndrome (Lipodystrophie progressive, syndrome de Barraquer Simons) *Presse med*, Par, 1935, 43 1672

The author describes a family in which a direct, homologous heredity of progressive lipodystrophy was demonstrated in three generations. Barraquer-Simon disease is characterized by unequal distribution of the fatty tissues with their disappearance especially from the face as contrasted to their normal or even exaggerated development in the buttocks, thighs, and legs. The syndrome was first described in 1906 by Barraquer Roviralto. Of seventy two cases collected by Coates in 1926, fifty-one were cases of women and children. Emaciation of the face is the first symptom to attract attention. The skin and the motility of the muscles are normal. Soon the emaciation may extend to the neck, shoulders, chest, and arms. Ultimately the skin adheres directly to the muscles. In some cases the arms are not affected at all or not until after a period of years, whereas in others they are involved simultaneously with, or even before, the face. Except for a relative asthenia in a few cases, there are no other symptoms. The disease does not cause death. It is particularly common in Jews. There are no associated psychopathic or atrophic symptoms, and the electrical reactions of the muscles and the reflexes are quite normal.

In the case reported by the author the condition became noticeable at the age of twenty years and investigation revealed that the patient's mother and grandmother had been similarly affected. There was also a familial history of epilepsy.

Various endocrine disturbances (pituitary, pineal, thyroid) have been considered as possible etiological factors, but the pathogenesis of the disease is still obscure. An endocrine vegetative dysequilibrium and constitutional disposition are probably involved. The symmetrical distribution of the dystrophy suggests nervous components. The disappearance of fat is due to inhibition of the lipophilic process in the upper half of the body. No anomalies of innervation are demonstrable on histological examination.

The condition is easily differentiated from facial hemiatrophy because in the latter the atrophy is unilateral, and from Landouzy-Dejerne facioscapulo humeral myopathy because, in progressive lipodystrophy, the motor function of the facial muscles is not affected. In Simmond's disease there are numerous symptoms pointing to involvement of the pituitary gland.

No successful treatment for progressive lipodystrophy has been discovered. Various endocrine preparations, including insulin and epiglandol, have been tried, but without result. Insulin has an exacerbating effect. The author suggests that perhaps the alternate administration of insulin and lipidin might prove beneficial. EDITH S. MOORE

Collier, F. A., and Maddock, W. G. A Study of Dehydration in Humans. *Ann Surg*, 1935, 102 947

From a water-balance study involving the dehydration of two normal adult subjects and the hydration of a patient who showed moderately severe effects of depletion of the body water, it was apparent that, with a loss of body fluid amounting to about 6 per cent of the total body weight, an individual is at the beginning of serious dehydration. At this point, the clinical signs of dehydration are well established. The blood is concentrated and the urine output insufficient to maintain normal kidney function, the non-protein nitrogen of the blood being therefore above normal. The effort of the kidneys to rid the body of waste materials under such adverse circumstances may result in kidney damage, as shown by the occurrence of protein, casts, and erythrocytes in the urine.

From the findings of this study the authors conclude that a water intake of about 1,500 c cm is needed for the production of urine, and that losses from vomiting or drainage should be measured and the corresponding volume of water added to the intake. About 1,500 c cm per day should compensate for the vaporization from the skin and lungs. For patients showing the beginning signs of dehydration, a fair estimate of this water need is 6 per cent of the total body weight.

From these calculations of water requirements it is evident that the usual 2 or 3 liters of fluid intake are entirely inadequate for the seriously dehydrated patient. J. FRANK DOUGHTY, MD

Allen, E. V., and Ghormley, R. K. Lymphedema of the Extremities: Etiology, Classification, and Treatment. A Report of 300 Cases. *Ann Int Med*, 1935, 9 516

Lymphedema, which affects human beings, appears to have a multiple etiology. Lymphatic stasis occurs primarily as a result of obstruction produced by inflammatory or non-inflammatory processes or by lymphangectasis, which occurs in association with congenital lymphedema. When obstruction occurs, the intralymphatic pressure increases and causes dilatation of lymph vessels with subsequent insufficiency of the valves, forcing lymph to seek new channels which are supplied inadequately with

valves Since valves are very important in causing the lymph to move centrally, incompetence of the valves causes further stasis of lymph The protein content of the lymph increases and fibroblasts proliferate rapidly since the lymph is an excellent culture medium for the growth of fibroblasts This fibrosis contributes further to lymph stasis As a result of the increased quantity of lymph in the tissues, attacks of acute inflammation may recur producing thrombosis of lymph vessels, more stasis of lymph, and hence more fibrosis The vicious cycle consists of stasis of lymph fibrosis, inflammation with further stasis, and more fibrosis

The cases of lymphedema studied lend themselves to division into two main groups, inflammatory and non-inflammatory The terms "infectious" and "non-infectious" could be used as well The division into the two groups indicates the original state Lymphedema which is originally non-inflammatory may be complicated eventually by inflammatory changes Most cases of lymphedema may be classified without difficulty according to this scheme The classification is purely clinical

To be of value medical treatment must be carried out early No medical treatment is of value when the limb is greatly hypertrophied from the overgrowth of connective tissue Treatment must be instituted when the edema first becomes evident The longer uncontrolled lymphedema exists the more fibrosis occurs and the less efficient medical treatment becomes This point needs to be emphasized as in most of the authors' cases of lymphedema the lymphedema has been present for a long time and marked fibrosis which cannot be influenced by medical treatment has already occurred

The necessity of surgical treatment of lymphedema is a frank admission of the failure of medical treatment in those instances in which the best medical treatment has been carried out In many instances however surgical treatment is necessary because medical treatment has been carried out inefficiently or not at all The selection of cases of lymphedema for surgical treatment depends on the cause and severity of the lesion There is no need to perform the operation in cases in which malignancy exists or in cases in which causative conditions of greater importance than lymphedema such as Hodgkin's disease or pelvic tumors exist Unfortunately the patient who has mild lymphedema cannot be promised a great deal of benefit The leg can be restored to normal size and to nearly normal shape but there is no assurance that such restoration will be in any way permanent unless an adequate type of supporting bandage is worn for an indefinite period Therefore the more severe the case the more one can offer in the way of relief with surgical treatment A history of attacks of cellulitis is not a contra-indication to surgical treatment On the other hand one can reasonably assure patients who have had recurrent attacks of cellulitis that the frequency of these attacks will be reduced One should, of course not operate during an attack of cellulitis

The immediate pre-operative care should consist of rest in bed for a few days with the affected limb elevated continuously to reduce the edema Diuretics, such as salyrgan, and firm bandaging may hasten the disappearance of edema In from three to six days as a rule, there will be a reduction of the amount of lymph in the limb to the minimum which will make the surgical procedure much easier

The various surgical methods which have been used for the treatment of lymphedema have been reviewed by Ghormley and Overton The procedure used at the Mayo Clinic is that described originally by Kondoleon and modified by Sistrunk

Abel J J The Toxin of the Bacillus Tetani Is Not Transported to the Central Nervous System by Any Component of the Peripheral Nerve Trunks *Rev Soc argent de biol* 1934 10 107

The author cites numerous facts in support of his belief that tetanus toxin and dyestuffs injected in an aqueous medium either intraneurally, subcutaneously, intramuscularly or intravenously are not carried in the axis cylinders, the lymphatic vessels or the tissue spaces of the peripheral motor nerves to the reacting cells of the central nervous system He refers to the recent investigations of anatomists who traced the outflow of lymph from nerve trunks and found that it, like the lymph of other structures of the body, is added finally to the venous blood and not to the cerebrospinal fluid He calls attention also to a series of investigations carried out in the period from 1910 to 1914 in which it was shown conclusively that alkaloids and dyestuffs cannot be distributed throughout the body by any peripheral mechanism such as the "tissue spaces" Later he will report investigations which have been in progress for more than two years on the pathogeny of local tetanus, the influence of complete denervation of muscles the course of the poisoning and the reflex phenomena and other aspects of both experimental and natural tetanus He states that he and his associates find themselves quite unable to accept the current theories with regard to many of these points as they were to accept the current theories discussed in this article

WALTER H NADLER M D

Swift H F Lancefield R C and Goodner H The Serological Classification of Hemolytic Streptococci in Relation to Epidemiological Problems *Am J Hyg* 1935, 190 445

Human infections with streptococcus hemolyticus representing characteristic clinical entities may be caused by entirely different strains in different individuals Similarly the same strain may cause different clinical entities in different persons Lancefield has shown that hemolytic streptococci can be differentiated serologically into distinct and sharply defined groups by means of the precipitin reaction based on the fact that the strains of each group contain a common specific carbohydrate, the so-called "C" substance Group A includes most of

those which have been isolated from human infections and human carriers. For epidemiological studies each group must be differentiated into separate types. Group A may be divided into serological types on the basis of specificity of "M" substance according to Lancefield, or by the special slide-agglutination technique with especially absorbed sera as advocated by Griffith. These types are as highly specific as are the types of pneumococci.

Grouping permits one to obtain an approximate idea of the animal species from which the strain originated and of its potential pathogenicity for man. Typing permits one accurately to follow the course of epidemics in limited populations.

ELIZABETH M. CRANSTON

Klein, S. A. The Importance of the Antivirus of Besredka in Surgery (*Die Bedeutung des Antivirus von Besredka in der Chirurgie*). *Beitr. z. klin. Chir.*, 1933, 162, 13.

The antivirus of Besredka is a substance which is formed from the dead and destroyed bacteria during the growth of a pure culture in bouillon. The immunity following an infection is ascribed to it. The author has studied the action of antivirus in animal experiments and in pathological conditions in human beings. On the basis of his findings he ascribes to the antivirus an immunizing and weakly antiseptic action which depends on the nature and quantity of the virus. He attributes the immunizing action to (1) an activation of protoplasm, and (2) an as yet unknown factor of bacterial decomposition.

The antivirus is not specific. In infected fractures in rabbits, treatment with antivirus had a very favorable effect. While the control rabbits became severely ill or died, healing occurred in those treated with the antivirus. Equally favorable were the results obtained in perforated appendicitis and peritonitis produced experimentally in rabbits. In clinical cases favorable results were not obtained, the antivirus had no apparent influence on peritonitis. However, the author believes that the antivirus is of prophylactic value. In cases in which it was employed in association with procedures likely to cause contamination, such as operations for carcinoma of the colon and rectum, remarkably good healing occurred. In infected injuries of human beings no effect of the antivirus on healing could be demonstrated with certainty.

(E. KOENIG) JACOB C. KLEIN, M.D.

Ramsdell, E. G. *Calcinosis Universalis*. *West J. Surg., Obst. & Gynec.*, 1935, 43, 624.

The case reported was that of a child ten years old. The condition ran a long febrile course with marked loss of weight, scleroderma, the deposit of enormous amounts of calcium in the subcutaneous tissues, and a marked vasospasm of the peripheral vascular system suggesting the Raynaud type, with a normal blood calcium and blood phosphorus.

At operation, hyperplasia of the thyroid but no demonstrable parathyroid change was found.

Unilateral thyroidectomy and attempted parathyroidectomy were followed immediately by marked relief of the vasospasm and rapid absorption and melting of the tissue calcium. PAUL STARR, M.D.

Salvesen, H. A. The Sarcoid of Boeck, a Disease of Importance to Internal Medicine. *Acta med. Scand.*, 1935, 86, 127.

The sarcoid of Boeck was originally described as a skin disease, but has been proved to be a disease with a general distribution in the lymphatic system, the internal organs, and the bones.

The author reports four cases. The patients were one man and three women ranging in age from thirty-eight to fifty-six years. Two of the patients presented symptoms not hitherto described in descriptions of Boeck's sarcoid. One of the women suffered from contracted kidney with peculiar clinical features, a low blood pressure, and neuritis of the optic nerve in addition to skin sarcoids and lung lesions of the usual type. A woman thirty-eight years old had a heart lesion with intermittent blocking of the right division of the bundle of His dependent partly on the heart rate. The author presents the electrocardiograms made in this case which show transition from normal conduction to block and, under the influence of amyl nitrate, from block to normal. The man had glandular tumors, iridocyclitis, enlargement of the spleen, and extensive infiltration of the lung for three years before the skin sarcoid appeared. In three cases in which the serum protein was determined an increase ranging from 9 to 9.67 per cent was found.

The author believes that the sarcoid of Boeck should be included in the textbooks of internal medicine.

Raven, R. W. Sacrococcygeal Cysts and Tumors. *Brit. J. Surg.*, 1935, 23, 337.

The sacrococcygeal region is one of the most common sites of anomalous cysts, sinuses, and tumors of various kinds. This is not surprising when the complex nature of the development of this part of the body is taken into account. The author cites the changes occurring in the caudal extremity of the primitive streak, the formation and disappearance of the neurenteric canal and the post anal gut, and the formation of the terminal part of the intestinal tube by the development of the anal canal. Complicated changes occur also in connection with the genito-urinary system. It is possible that any of these primitive structures may leave a relic of their existence and furnish a contribution to that which has been described as a histological potpourri.

The author cites briefly certain cysts and sinuses which are encountered on the posterior aspect of the sacrum and coccyx. The most common lesion of this type is the pilonidal sinus or sacrococcygeal fistula. Blind Sutton attributed this lesion to faulty coalescence of the cutaneous covering of the back and compared it to the interdigital pouch of the sheep. Newell states that it is a dermoid caused by

traction of the underlying tissues on the median raphe when retrogression of the tail begins

Pathological structures on the anterior aspect of the sacrum and coccyx may be classified as cysts and tumors. The cysts may be subdivided into (1) dermoid cysts (2) cysts arising from the embryonic post anal gut, and (3) sacrococcygeal cysts of meningeal origin. Practically all types of tumors have been found in the sacrococcygeal region.

Sacrococcygeal tumors must be differentiated from other swellings occurring in the pelvis such as fibroid tumors of the uterus, cysts of the ovary, tubal and abdominal pregnancy, pelvic abscesses, intraligamentous cysts, and anterior spina bilda.

Teratomas appear to be the most common variety of tumor in the sacrococcygeal region. In the present state of our knowledge of tumors in general and of teratomas in particular it is impossible to state the origin of sacrococcygeal teratomas. It appears true, as Nicholson suggests, that these neoplasms are malformations. Further knowledge of their origin will be gained as experimental embryology unravels the intricacies of the complex developmental processes and throws new light on the growth centers of the body at the caudal extremity. It may be that these malformations will be found due to a faulty coherence of embryonal parts and a diminution of growth momentum. JOSEPH K. NARAY, M.D.

Rogers H. and Hall M. G. Pilonidal Sinus Surgical Treatment and Pathological Structure
Arch Surg 1935 31 142

After analyzing the treatment given in 181 cases of pilonidal sinus the authors conclude that the economic loss incident to radical excision is greater than the importance of the disease warrants.

Injection of the tract with dyes under pressure leads to the removal of a larger amount of tissue than is necessary, as a great deal of normal tissue is thereby stained and consequently excised. On morphological grounds there are no indications for radical excision, and in a bloodless field diseased tissue is recognizable from its appearance and its consistency.

The best results have been obtained by removing only the diseased tissue under local anesthesia with the cautery and subsequently as it is recognized in the healing wound. Under such treatment the patient is ambulatory most of the time, there are fewer recurrences, less mutilation results, and the economic loss is less. GEORGE A. COLLETT, M.D.

Mabrey R. E. Chordoma: A Study of 150 Cases
Am J Cancer, 1935 25 501

Chordoma is a rare and usually fatal tumor which arises from the fetal notochord. Mabrey reviews from the clinical point of view all cases reported to date and 8 additional cases, 150 in all. He discusses the location, age, and sex incidence of the tumor, the symptoms of the 3 groups, the diagnosis, the morbid anatomy, the treatment and prognosis, and the occurrence of metastases. His conclusions are:

1 Chordoma arises from remnants of the fetal notochord.

2 It is found twice as often in the sacral region as in the cranial region. It sometimes involves the vertebrae.

3 It may occur at any age, but is most frequent at the 'cancer age'. It is twice as common in men as in women.

4 There are no characteristic symptoms.

5 The diagnosis rests on the presence of a tumor in the sacral region and a defect in the sacrum and the discovery in a section of large vacuolated cells and a homogeneous mucinous like substance.

6 The prognosis is not good.

7 In cases of sacrococcygeal chordoma the treatment should be surgical whenever possible. X-ray and radium treatment are probably of some value in advanced cases. CARL R. STEINKE, M.D.

Strong, L. C. The Effect of Oil of Allspice on the Incidence of Spontaneous Carcinoma in Mice
Am J Cancer 1935 25 607

The investigations reported were made on two series of mice which belonged to the same highly inbred strain (the Strong A strain) and were subjected to the same treatment up to the time of the experiment. During the experiment both series were placed on an oatmeal diet, but the first series were given small amounts of oil of allspice in addition.

The incidence of spontaneous carcinoma of the mammary gland was higher in the controls (39.9 per cent) than in the experimental animals (20.30 per cent) and the condition occurred at an earlier age (368.2 days) in the former than in the latter (440.3 days). That the experimental animals were not in any way impaired was evident from the fact that the negative individuals of this group (the animals that died of a condition other than cancer) lived longer (433.7 days) than the corresponding controls (341.2 days).

The findings seemed to indicate that the daily administration of oil of allspice has a controlling influence on carcinoma of the mammary gland in mice.

WALTER H. NADLER, M.D.

Kubany, E. A Case of Congenital Sarcoma (Ein Fall von angeborenem Sarkom). *Zentralbl f Chir* 1935 p 2126

The author reports the case of an infant which was born with a tumor the size of a child's fist in the left posterior axillary fold and a dense infiltration of the axillary lymph glands. The tumor grew to double its original size within nine days and was removed by the author, together with the regional glands. The specimen weighed 112 gm and measured 13 cm. in its greatest diameter. The pathologic-anatomical diagnosis was fibrosarcoma. The mother had sustained a trauma to the uterus from a shovel handle in the seventh or eighth month of pregnancy.

The author calls attention to the possibility of a relationship between trauma and sarcoma.

(VON SCANDONI) LEO M. ZIMMERMAN, M.D.

Brabec, L. B. A Quantitative Investigation upon the Occurrence of Vitamin G in Rat Sarcoma 39 *Am J Cancer*, 1935, 25 557

The author reports quantitative determinations of the content of Vitamin G in rat sarcoma and in liver tissue from the same animals. The results show a considerable difference in the Vitamin G content of equal weights of tumor tissue and liver tissue from animals raised on a diet consisting of two thirds whole wheat and one third whole milk powder plus sodium chloride to the extent of 2 per cent of the weight of the wheat. The Vitamin G content of the tumor tissue was low. The liver tissue was approximately seven times as rich in Vitamin G per gram as the tumor tissue. The results were the same whether the average total gain made by the experimental animals was determined for five weeks or eight weeks.

While the liver tissue from animals with growing transplanted tumors appeared to be somewhat lower in Vitamin G than liver tissue from animals without growing tumors, the results of this investigation furnished no evidence that the growing tumor consumed Vitamin G in the body of the host. It was found that a diet otherwise adequate but deficient in Vitamin G does not prevent the taking or growth of Sarcoma 39.

WALTER H. NADLER, M.D.

DUCTLESS GLANDS

Repetto, E. Experimental Studies of the Functional Correlations Between the Thyroid and Liver (Ricerche sperimentali sulle correlazioni funzionali fra tiroide e fegato) *Arch Ital di chir*, 1935, 40 564

Experiments were performed on dogs to determine whether there is any relationship between the function of the thyroid and the function of the liver. The author presents the protocols of the experiments and tables showing the results in detail. He emphasizes that a study should be made, not of liver function as a whole, but of liver functions. One function of the liver may be affected while the other functions are entirely normal. Repetto studied particularly the metabolism of carbohydrates, proteins, and cholesterol.

His findings show that after either partial or total removal of the thyroid there was a decrease in the glycogenic function of the liver manifested by hypoglycemia, i. e., that capacity of the liver for splitting glycogen into glucose and returning it to the circulation was decreased. There was also a hyperlactacidemia, probably due to a decrease in the capacity of the liver to transform or destroy lactic acid. In addition there was a marked decrease in protein metabolism shown by an absolute decrease of the urinary urea in twenty-four hours parallel with an increase of azotemia and a decrease in the elimination of ammoniacal nitrogen and amino acids. There was also a marked increase in the amount of cholesterol in the liver, spleen, kidneys, and muscles after

total or partial removal of the thyroid, indicating a decrease in capacity of the liver to transform and eliminate cholesterol.

Evidently, therefore, there is marked synergy between the thyroid and liver, and a decrease in thyroid function brings about a decrease in liver function.

AUDREY GOSS MORGAN, M.D.

Hellstroem, J. Hyperparathyroidism, A Real and Practically Important Disease (Hyperparathyroidismus—eine aktuelle und praktisch wichtige Erkrankung) *Nord med Tidsskr*, 1935, pp 337, 375

In recent years there have been many reports on hyperparathyroidism. The author refers the reader to articles which have appeared previously in the *Zentralorgan* Wijnblad (1932), Amelinn (1933), Lambert (1933), and especially the clinical and experimental studies of Ask-Ugmark, entitled "Parathyreoida und Calciumsalz im Organismus" (1931). He believes these references will preclude unnecessary repetition.

The author's statements are based mainly on the French and American findings. The authors, Leriche, Jung, and Albright, and Aub and Bauer are referred to most frequently. Hellstroem also refers to the transactions of the French and Italian Congresses in 1933, the German Surgical Congress in 1935, and the International Surgical Congress held in Cairo in 1935. By reading these references all the clinical and experimental results of the study of the function and dysfunction of the parathyroids known up to this date may be reviewed. The author's contribution on hyperparathyroidism contains a report of five personal cases.

The author classifies hyperparathyroidism, in accordance with the reports of American authors, into six types: (1) classical hyperparathyroidism or von Recklinghausen's disease, (2) osteoporotic hyperparathyroidism, (3) hyperparathyroidism with nephrolithiasis, (4) hyperparathyroidism with renal insufficiency, (5) hyperparathyroidism which simulates or is complicated by Paget's disease, and (6) acute parathyroid poisoning. The diagnosis is always made with the discovery of an altered calcium metabolism, primarily with the clinical findings of hypercalcemia. At the same time there is an abnormally low content of phosphorus in the blood and an increase of calcium in the urine, which is evidence of the disturbance of the calcium balance. Exceptions to these general rules are probable. American authors believe also that the response to electrical stimulation is important, and that delayed response (chronaxy) is a pathological symptom indicative of muscular hypotonia.

The findings which are important for the differential diagnosis between hyperparathyroidism and other diseases of the bones are tabulated according to the American authors, Albright, Aub and Bauer. They serve to differentiate hyperparathyroidism from senile osteoporosis, Paget's disease, osteomalacia, solitary bone cysts, solitary benign giant-cell

tumors, osteogenesis imperfecta, multiple myelomas malignant metastases, and basophilic adenoma of the hypophysis (Cushing's disease)

In the great majority of the cases of hyperparathyroidism an adenomatous hypertrophy of one or more of the parathyroid glands has been found. When exceptions are noted they may be explained by the fact that the parathyroid adenoma may be so located that it is easily overlooked during operation or autopsy—for instance in the mediastinum or buried in the thyroid gland. Certainly, the parathyroid adenoma plays the same rôle in hyperparathyroidism as thyrotoxicosis in hyperthyroidism. Here also, there may be exceptions. In the treatment it must be remembered that remissions, possibly even with spontaneous cure are possible. However as a rule hyperparathyroidism is a progressive disease leading quickly to invalidism and early death. Calcium preparations, vitaminol and heliotherapy give relief at times, and in rarer instances some improvement. However as long as definitely therapeutic internal medication is unknown surgical intervention should not be delayed. Mandl paved the way for this procedure in 1926 (*Deutsche Zeitschr f Chir* 1933 and *Beitr z klin Chir* 1934). Since then the number of cases in which operation was performed has increased to over 100. The rapid sudden change in the general condition of the patient, the changes in the calcium metabolism and the danger of postoperative tetany are well known. Of course, complete restitution to the normal can be expected only in the early recognized cases in which operation is performed in time. In the advanced cases the condition can be arrested but the patient will be left more or less of an invalid. Therefore, the necessity of diagnosing the condition and performing parathyroidectomy in the early stages is to be emphasized. Early diagnosis is important also in regard to the

renal symptoms in order that kidney damage (renal insufficiency) has not progressed too far before intervention takes place. As hyperparathyroidism is associated with an overproduction of the parathyroid hormone it was believed that the normal parathyroid glands could be removed also. However, the author is very skeptical of the results reported. The slight tetany which usually is observed postoperatively can be quickly overcome with the administration of calcium and parathyroid hormone.

The operative mortality in the cases of parathyroidectomy reported up to date is about 10 per cent. This percentage could be reduced if the operations were limited to the removal of only true parathyroid adenomas. As mentioned before in the operative technique (Kocher collar incision) a methodical search should be made for the adenoma as it may lie in varied locations, even in the mediastinum.

In contrast to the results from roentgen irradiation in hyperthyroidism, the results in hyperparathyroidism are very limited. The ankylosing type of polyarthritis has also come to be considered a sign of hyperparathyroidism and parathyroidectomy has also been done in these cases. This procedure has both enthusiastic followers and skeptics. From the reports in the literature it seems certain that the operation will be of value if there is a definite increase in the calcium content of the blood. The same may be said of parathyroidectomy if used for the osteitis deformans of Paget. Similar statements have been made regarding parathyroidectomy in cases of scleroderma, progressive muscular atrophy and myositis ossificans. However as yet no information has been obtained regarding permanent results in the last mentioned cases. The author refers the reader to the article by Bjuve in the *Zentralorgan* for 1935 No 13791.

(GERLACH) WILLIAM C BECK M D

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NOTE—THE BOLD FACE FIGURES IN BRACKETS AT THE RIGHT OF A REFERENCE INDICATE THE PAGE OF THIS ISSUE ON WHICH AN ABSTRACT OF THE ARTICLE REFERRED TO MAY BE FOUND

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INTERNATIONAL ABSTRACT OF SURGERY

OCTOBER, 1936

COLLECTIVE REVIEW

A COMMENTARY ON SOME OF THE 1935 LITERATURE ON THYROID DISEASE

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INTRODUCTION

SEVERAL important reviews of thyroid disease appeared during 1935. Among the authoritative series of articles on glandular physiology and therapy published under the auspices of the Council on Pharmacy and Chemistry of the American Medical Association there were 2 articles by Marine, one on thyroid physiology and the other on endemic goiter, and 1 article by Means on the therapeutics of the thyroid. These reviews, although brief, are epitomes of modern knowledge of thyroid physiology.

After a historical summary, Marine briefly discusses that aspect of thyroid study which has become so active during the last five years, namely, endocrine interrelationships. Several fundamental facts are enumerated. Persons and animals with large parenchymatous goiters have greatly enlarged anterior pituitaries. Enlargement of the anterior pituitary occurs after thyroidectomy, and the younger the animal the greater the enlargement. The anterior pituitary gland produces a thyroid stimulating, that is, a thyrotropic hormone. Animals treated with this material exhibit the physiological, pathological, and clinical characteristics of hyperthyroidism occurring in man, including exophthalmos.

"The relation of thyroid secretion to the development of the exophthalmos of exophthalmic goiter has long been a controversial question. Prevailing opinion favored the view that it was in some way connected with hypersecretion by the thyroid. Recent work by Marine and Rosen

has shown that such a view must be modified, since thyroidectomy notably facilitates the production of exophthalmos. At least two factors are necessary for its production: (1) a relative or absolute deficiency of thyroid secretion, and (2) an excess of the thyrotropic factor (Marine)."

Thyroid gonadal relationships are now explained on the basis of the action of the thyroid secretion, thyroxin, or of the gonadal secretion, thyelin, upon the pituitary to suppress the thyrotropic or gonadotropic pituitary hormone respectively. In regard to thyroid-chromaffin relations Marine says that all later observations support the original view of Asher and Flack that the thyroid hormone increases the irritability of the sympathetic nervous system or sensitizes in some way the tissues innervated by it so that they are more susceptible to stimulation by epinephrin. This is of importance in relation to the theory of Eppinger and Levine in regard to the action of total ablation of the thyroid upon angina.

Marine's article on endemic goiter is a fundamental discussion beginning with his own epoch-making studies in 1909 and including recent reports of iodine prophylaxis from many countries. While admitting the possibility of "iodine Basedow's disease" and hence excluding patients with long standing adenomatous goiter from those receiving prophylactic treatment, Marine advises the general use of iodized salt (1:100,000). He states that, in addition to the prevention of endemic goiter in children, there are several side-effects of goiter prevention that should be men-

tioned. The first is the elimination of congenital goiter and cretinism. This result becomes manifest within the time limits of a single pregnancy, but in man will require a complete reproductive cycle for full proof. The second is the reduction in the number of individuals requiring partial strumectomy. This result is beginning to become manifest after ten years of general prophylaxis. In 1934 McClure reported that the number of thyroid operations in 7 hospitals in southern Michigan fell from 1,452 in 1927 to 591 in 1933, a drop of 60 per cent as compared with a drop of 17 per cent in all surgical operations during that period. The third benefit—the decline in the incidence of benign and malignant epithelial tumors of the thyroid—will likewise require another decade in the case of benign tumors and a longer period in the case of malignant tumors before adequate statistical proof becomes available. The figures given by Wegelin for malignant tumors of the thyroid in Berlin, where the incidence of goiter is low, and in Bern, where it is high, illustrate the influence of goiter on thyroid carcinoma and indicate the change that must take place when the incidence of goiter in the tumor age group is reduced. In Berlin 13 malignant thyroid tumors were found in 13,426 autopsies, while in Bern 159 were found in 13,250 autopsies.

Means' review of the treatment of thyroid diseases and the use of thyroid gland in treatment contains some general statements that should be more widely known and accepted: (1) By the term 'goiter' is meant enlargement of the thyroid from any cause. This term has no pathological connotation since the pathological nature of an enlargement cannot be identified clinically. (2) By the term thyrotoxicosis is meant the toxic state resulting from an excessive supply of the thyroid hormone. From the therapeutic standpoint nothing is gained by trying to split toxic goiters into 2 or more types; the treatment for all is the same. (3) The indication is to abolish the hyperfunctioning of the gland. To date only 2 procedures that can accomplish this permanently are known—irradiation and surgical resection of the thyroid. Irradiation, though sometimes effective, is unquestionably inferior to resection. After making these statements Means outlines the pre-operative and postoperative management of thyrotoxicosis.

Bauer's interesting discussion of the fundamental mechanism involved in hyperthyroidism, given in Paris in February of this year, is representative of a mixture of the best American and European thought. Bauer does not accept the theory of distinct separation of exophthalmic goiter from a

simple state of hyperthyroidism. He says that the apparent differences are only the expression of a variable degree of thyroid intoxication and, above all, of differences in reaction to this intoxication. He points out that the clinical reactions to acute massive poisoning of any sort are uniform for the poison involved, but that in chronic intoxication to small doses, the clinical pictures are very different, very variable and sometimes even difficult to differentiate. He calls this the law of mode of reaction of the individual. He applies it to mild chronic hyperthyroidism in which only one bodily system or process, such as the skin, the nerves, the digestive apparatus, or the metabolism, may be affected at a time. He thinks it is due to a different threshold to thyroid hormone action in different tissues. This action may be so extreme as to produce hyperthyroidism with definite symptoms without elevation of the metabolic rate. However, Bauer points out that the metabolic rate is not controlled exclusively by the thyroid. He emphasizes that it is the general clinical picture and not the elevation of the basal metabolism nor any other change revealed by tests which determines the gravity of a given case, and he calls attention to the contrast, noted by every student of clinical hyperthyroidism, between the desperately sick patient with a relatively low metabolic rate and the almost well patient with a high metabolic rate. In his discussion of the treatment, the European point of view that operation should be delayed is represented by his statement that serious cases must be treated surgically if they do not respond to purely medical care in two or three months. He says that in moderately severe cases operation is required if there is no improvement to medical and irradiation treatment in six months. In mild cases the best results are usually obtained with irradiation therapy. If this fails, surgical intervention should be carried out. The very light cases belong to medicine and are cured by medicament diet, and climate. Barbiturates and ergotamine are used. Bauer comments on the prolonged iodine treatment of hyperthyroidism employed so generally in France, Belgium, Roumania, and certain other countries. He is in agreement with American authorities that it is not curative and that iodine should be used only in connection with surgery.

Three additional points are of particular interest to Americans. There is a considerable volume of foreign literature upon protective substances derived from the blood. Originally these were represented by the thyroidectomized goat serum of Mochus, next by Blum's "tyronormon" and more recently by a product studied by Anselmino

and Hoffman Bauer reports that he has made a clinical trial of these materials in hyperthyroidism, but has never observed an incontestable cure resulting from their use. He has the same conclusion to offer in regard to diiodotyrosine, which Abelin has described as antagonistic to thyroxin. Goldzieher, in his recent book, repeats this fallacy of Abelin's. Bauer comments on Collip's anti-hormone theory, citing experiments indicating that the so called antihormone substances are actually antibodies, as shown by recent reports.

Boothby's review of progress in the study of thyroid disease up to 1935 is divided as follows:

1 An interesting section tracing the causes of the progressive decrease in the surgical mortality in exophthalmic goiter from early times to the most recent reports from surgical clinics.

2 A very brief and derogatory comment on "medical treatment." It might be suggested, in defense, that actually there is no definite medical treatment as yet. The reports quoted give a very high mortality. It is to be hoped that a form of treatment based on a definite endocrine physiological mechanism may be found. Boothby states that, because of the reduction of the surgical mortality to its present low level, interest in the x-ray treatment of hyperthyroidism has almost entirely disappeared. Such a conclusion is open to question.

3 A discussion of pre-operative iodine therapy in hyperthyroidism. It is generally recognized both in America and in Europe that credit for the general use of this procedure is due to Plummer. Considerable space is devoted to a presentation of Plummer's differentiation of adenomatous goiter with hyperthyroidism from exophthalmic goiter, and to Plummer's theory that the latter owes its character to "an abnormal intermediate by product" produced by the thyroid, which is abolished during the pre-operative iodine treatment. These clinical, pathological, and physiological concepts were advanced more than ten years ago (Mayo and Plummer). No objective evidence substantiating them has appeared and none is advanced in this review. The beneficial effect of Plummer's pre-operative iodine therapy in so-called adenomatous goiter with hyperthyroidism which, contrary to these theories, has been shown in a number of clinics and by Plummer, himself, is explained by Boothby on the grounds of erroneous clinical diagnosis. The fact that the metabolic rate rises even during continued iodine administration after the primary iodine remission in exophthalmic goiter, as first demonstrated by Starr, Segal, Walcott, and Means, would have to be interpreted as indicating a transformation of exophthalmic goiter into adenomatous goiter with

hyperthyroidism, yet it is difficult to see how this could occur if the two conditions are "distinct clinicopathological entities." If the iodine "abolishes the abnormal product" present in exophthalmic goiter it should continue to do so.

4 A review of the calorigenic action of thyroxin and allied products, in which reference is made to the early work on metabolism leading to the clinical preparation of the thyroid hormone by Kendall and by Harrington, and the metabolic studies with various thyroid derivatives by Carlson, Salter, Palmer, Means, and Abelin.

5 A discussion of endemic goiter in which the classical work of Marne and of McCarrison is outlined and Boothby draws the following conclusion: "The successful result of prophylactic measures (i.e., iodine), wherever tried, with practically no harmful effects, has convinced most of the leaders of the medical profession of the safety of carefully supervised prophylactic methods."

6 A short review of experimental thyroid physiology which outlines the developments from the important observation by Chesney, Clawson, and Webster that rabbits fed on cabbage may develop goiter of a peculiar type. Marne's studies of this subject led to the conclusion that the goitrogenic substances are cyanide compounds, chief of which is acetonitrile, and that an antigoitrogenic substance in cabbage is civitamic acid. In this review and elsewhere the general impression is expressed that the cabbage goiter produced in rabbits by Chesney, Clawson, and Webster was a colloid goiter. However, these investigators stated specifically that this was not the case. Their description, which is well borne out by their photomicrographs, is as follows: "The microscopic appearance of the enlarged glands was, on the whole, uniform. There was obvious hyperplasia with no tendency to colloid formation. While some of the follicles contained colloid, these were relatively few in number and most of them contained no colloid or amounts much less than one sees in the normal thyroid. It was evident that the increase in size of the gland had been brought about by the formation of many new follicles or an extension of those already in existence, in other words, it was due to the production of new thyroid acinar cells and not to the formation of colloid or to the accumulation of much new interstitial tissue."

7 An outline of further experimental work with the thyrotropic hormone up to 1934, in which, however, the important work of German physiologists is not given sufficient prominence.

In a discussion of the medical aspects of thyrotoxicosis, Horder said that there is no evidence

that the secretion of a pathological thyroid differs from the secretion elaborated by a healthy gland. The beneficial effect of thyroidectomy upon hyperthyroidism does not prove that the thyroid is the cause of exophthalmic goiter, it may be only one element of a vicious circle. The onset of the disease is insidious. The diagnosis may be very easy or very difficult. Medical treatment may be tried for six months. Iodine is used, but no drug is specific. Operation is indicated in all cases in which auncular fibrillation has developed, and is definitely required when signs of congestive heart failure are present.

IODINE HYPERTHYROIDISM

Jackson and Freeman again raised the confusing problem of iodine hyperthyroidism. Unfortunately they make this problem more complex by attempting to prove two things at the same time, namely, an effect of iodine on non-toxic adenoma and an effect of iodine on toxic adenoma. The activation of non-toxic adenomas by iodine has been claimed for many years by competent observers, and recently this claim has received support from the observations of McClure. Furthermore, it has experimental substantiation in the iodine hyperthyroidism, occasionally of fatal degree that occurs in rabbits with cabbage goiter. On the other hand, the effect of iodine on an already toxic adenoma may be a quite different phenomenon. Many clinicians with experience covering hundreds of cases of toxic adenoma, some of whom are quoted later, obtain beneficial control of the hyperthyroidism already present by giving the patients iodine.

HYPOTHYROIDISM

Myxedema was discussed by De Wesselow in a symposium on thyroid diseases appearing in the *Practitioner* for December, 1935. De Wesselow remarked that at one time or another almost every symptom associated with the disease has been put down, without sufficient proof, to a lack of thyroid secretion. Means and Lerman discussed myxedema on the basis of observations in their clinic extending back twenty years. They stated that persons who develop myxedema are of a characteristic physical and mental type. Such persons tend to be broad shouldered, short necked, and stocky, and mentally they are characterized by amiability. In the article cited there is a schematic diagram based on determinations made in the cases of 50 individuals which shows the variation of the basal metabolic rate in a normal person as compared with the variation in a person with myxedema. It is much less in the

former than the latter. The relation of symptoms to the level of the metabolic rate is also indicated. The authors stated that fully developed symptoms of hypothyroidism are rarely present unless the basal metabolic rate is below -30. With a rate between -20 and -30, slight symptoms are present, whereas with a rate above -20, symptoms are rare. The charted information regarding thyroid dosage for complete myxedema is exact and valuable. One half grain daily of USP thyroid will raise the basal metabolic rate from -40 to -20 in thirty days, 1 gr. daily will raise it from -40 to -10 in forty days, 1½ gr. daily will raise it from -40 to -5 in fifty days, and 3 gr. daily will raise it from -40 to 0 in sixty days. When the administration of thyroid is stopped, a fall in the basal metabolic rate, equally slow, occurs, producing the so-called curve of decay of the hormone. However, the symptoms of myxedema lag far behind (three months) the falling metabolic rate. In regard to borderline cases of hypothyroidism and their symptoms, Means and Lerman stated that patients with a moderately low metabolic rate, say -20, usually do not have hypothyroidism but owe their low metabolic rate to some other mechanism. "We interpret our experience as signifying that a person either does or does not have myxedema. Borderline or half way types of hypothyroidism, we think, exist either not at all or rarely. Hypometabolism is no more synonymous with hypothyroidism than fever is synonymous with measles." Conversely, Means and Lerman found that in many cases the diagnosis of myxedema was missed for as long as five years.

The distinction between hypometabolism and hypothyroidism emphasized by Means is not maintained in the many articles dealing with a great variety of conditions in which a hypometabolic rate is found and hypothyroidism is assumed. Fortune, Lee, Hinton, Seward, Haines and Mussey, Conklin, Schutz, Monroe, Brown and Shea, and Davis cited menstrual disorders, mental states, fatigue, gastro-intestinal complaints, nervousness, arthritis, debility, and other conditions as indications of hypothyroidism. Concerning these conditions Means says, "Given any of these pictures in association with a low metabolic rate, the empirical use of thyroid is justified. If it confers any benefit (it may, or it may not), the physician and patient may both be thankful. If it does not, it should be discontinued. The reaction of the true hypothyroid individual is definite, precise, and predictable, that of these pseudo-myxedematous patients is indefinite, variable, and unpredictable. One is biologic substitution ther-

apy, the other is drug therapy" Le Loner and Mayer reported the instructive case of a woman who had 6 successive spontaneous abortions before her hypothyroid condition was recognized. The seventh pregnancy was continued to normal term under thyroid medication. The eighth, which began during the amenorrhea of lactation and in which thyroid treatment was not given, terminated in abortion. Schachter reported a case of myxedema following pregnancy.

Vomela reviewed the distribution, varieties, and diagnosis of cretinism in Czechoslovakia. By means of a questionnaire sent to individuals and institutions, Jackson was able to collect 512 cases of cretinism in the United States. This number was reported from 64 sources. The diagnoses were not analyzed critically, and information regarding the original geographic distribution of the cases was not available. Bronstein and Milles published a short report of the autopsy findings in 2 infants with athyreosis.

The detection of hypothyroidism in children has been greatly aided by comparison of the degree of ossification found by x-ray examination, especially in the wrist, in children suspected to have this condition with the degree of ossification in normal children. Canelo and Lissner reported 2 cases of childhood myxedema for the purpose of emphasizing the importance of studies of bone age in children. In this connection they cited articles by Hertoghe, Dieterle, Engelbach and McMahon, Shelton, and Lissner. As Canelo and Lissner pointed out, metabolism machines satisfactory for measurements in children are not generally available, standards for the young are uncertain, and children will not cooperate, therefore the determination of osseous age by x-ray examination is of extraordinary value in the recognition of pre-adolescent thyroid deficiency. It is also a reliable method of determining the effects of therapy.

Greenwald and Collens reported a case of diabetes associated with cretinism, a very rare condition. They gave references to the literature and drew the following conclusion: "It is evident from a study of Wilder's case and our own that the tissue cells can utilize a given amount of dextrose with less insulin when no thyroid or only a small amount of thyroid is given, with larger doses of thyroid, more insulin is necessary."

Eppinger and Salter prepared thyroglobulin from human thyroid glands obtained surgically. Its calorigenic activity was correlated to the thyroglobulin iodine administered. No difference in potency between similar doses of this material prepared from toxic and non toxic glands was noted. No discrepancy in response could be ob-

served between spontaneous myxedema and hypothyroidism produced by complete ablation of the thyroid. The addition of 0.1 mgm of thyroglobulin iodine to the daily dose of hormone elevated the basal metabolic rate to ± 5 points.

An important summary of thyroid chemistry was given by Harington. This may be abstracted as follows: Acid insoluble thyroxin and acid-soluble diiodotyrosine account for all the iodine in the thyroid gland. A great loss of physiological activity is sustained by thyroxin during the process of separation. This is shown by the fact that desiccated thyroid given by mouth has several times the activity of thyroxin even when the thyroid administered has the same amount of acid-soluble (thyroxin) iodine per dose. Furthermore, the activity of any thyroid preparation is proportional to the total iodine and not to the thyroxin iodine it contains, as Harington formerly believed. Hence, Harington now thinks that the natural active secretion contains both thyroxin and diiodotyrosine. The chemical structure found characteristic of physiological activity is the thyronine nucleus with halogen atoms at least in the 3,5 positions. Even 3,5,3,5-tetra-bromothyronine has some activity.

An important monograph on endemic cretinism by DeQuervain and Wegelin has just appeared. It includes a complete review of the clinical and pathological findings in cretinism, a discussion of prophylaxis and treatment, and a complete bibliography.

CHOLESTEROL METABOLISM

The importance of blood cholesterol measurements in hyperthyroidism, and especially in hypothyroidism, has been emphasized by the work of Hurxthal and Hunt. In a recent article these investigators reviewed the clinical relationships of the blood cholesterol and summarized present-day knowledge regarding cholesterol metabolism. Their own observations seemed to indicate that the blood cholesterol is increased with diminished thyroid activity and decreased with excessive thyroid function. While the findings of McGee raise some doubt as to the constancy of this relationship, they in general support this conclusion. McGee emphasized, however, that there was no constant inverse relationship of the blood-cholesterol level and the basal metabolic rate in his series of cases. In many patients with hyperthyroidism the blood cholesterol level was normal, and in 1 patient with that condition it was abnormally elevated. There can be little doubt of the diagnosis in this form of thyroid disease. Of McGee's series of patients with hypothyroidism, a large number had normal blood-cholesterol val-

ues and several had low values. In the cases of such patients with low metabolic rates the diagnosis is much less certain. However, McGee found normal blood-cholesterol values in several patients with a basal metabolic rate of less than — 25.

EXOPHTHALMOS

An important consideration of exophthalmos by Plummer and Wilder appeared in the *Archives of Ophthalmology* in 1935. The chief conclusion drawn which seems particularly significant was that there are 2 distinctly different forms of exophthalmos associated with thyroid disease. The first is that occurring during active exophthalmic goiter. This is usually bilateral not disabling definitely correlated in degree with the metabolic rate and arrested or decreased after either spontaneous iodine or surgical reduction of the hyperthyroidism. Its pathological anatomy is not clear. The second the so-called malignant or paradoxical exophthalmos (Zimmerman) is that occurring with a normal metabolic rate often post-operatively when the metabolism is low. This is progressive and associated with edema of the orbit and conjunctiva. It may be unilateral may lead to corneal ulceration and may necessitate enucleation. Its pathological anatomy has been described by Foster Burch and Naffziger. It consists among other features of a tremendous pseudohypertrophy of the extra-ocular muscles. These muscles may be from 1 to 3 cm thick. Zimmerman called attention to cases of exophthalmos of this type in 1909.

The experimental production of exophthalmos in the last few years has been particularly interesting. In young thyroidectomized rabbits that had been allowed to develop cretinism Kunde produced exophthalmos by feeding sufficient thyroid to cause hyperthyroidism. Loeb and Friedman observed exophthalmos in guinea pigs treated with thyrotropic hormone. Friedgood made the same observation but interestingly enough, the exophthalmos occurring in his experiments was most pronounced and occasionally chronic in the continuously treated animals that had become immune to the thyroid stimulating effect of the extract and had developed hypothyroidism. In a series of experiments Marine, Rosen, Spence, and Cipra first found that in rabbits maintained on a diet of alfalfa hay and oats bilateral exophthalmos could be produced by the daily intramuscular injection of methyl cyanide. In such animals the exophthalmos was associated with thyroid hyperplasia. Subsequently it was found that exophthalmos was more easily produced and more marked in rabbits from which the thyroid had been re-

moved. The same investigators succeeded in causing exophthalmos in guinea pigs by administering the thyrotropic hormone of the pituitary. The exophthalmos occurred as readily in thyroid ectomized animals as in animals that had not been subjected to thyroidectomy and usually earlier in the former than in the latter.

Marine and Rosen concluded from these experiments that exophthalmos is brought about by the stimulating action of the thyrotropic factor of the anterior pituitary, and that the thyroid gland takes no positive part in its causation. They believe that thyroidectomy stimulates the anterior pituitary to secrete more thyrotropic hormone. They found that removal of the superior cervical ganglion of the sympathetic abolished exophthalmos whether it was caused by methyl cyanide or by the thyrotropic hormone of the pituitary and concluded from this that the thyrotropic hormone causes exophthalmos by acting through a nervous mechanism.

Marine stated that for the development of exophthalmos 2 factors are necessary: (1) an excess of thyrotropic substance, and (2) thyroid deficiency. It may be objected however, that in clinical hyperthyroidism with exophthalmos neither of these conditions seems to be present, since blood iodine and metabolic observations indicate an excess of thyroid hormone in this disease and the only studies that have been made of the clinical occurrence of the thyrotropic hormone in hyperthyroidism—those made by Aron—indicate that this hormone is absent in exophthalmic goiter. Wilder cautions against application of the uncertain interpretation of the results of animal experiments to disease conditions in man.

Justin Besançon reported physiological and clinical studies which he carried on for several years in association with Labbe, Villaret and others. The findings of these studies are significant and may prove of considerable value if corroborated. They indicate that, both in the cat and in man epinephrin will produce exophthalmos with myosis (contrary to its usual action) in the presence of excess thyroid hormone and that this condition can be reduced by levorotatory volumbine cornanthine. Clinical treatment with this drug the daily administration by mouth of 5 capsules each containing 0.01 gm continued uninterruptedly for from four to six months is advised and reported as effective.

Brain reported the important case of an obese hirsute woman who developed unilateral exophthalmos while taking thyroid to reduce. When the use of thyroid was discontinued the exophthalmos gradually disappeared. Brain found 19 cases

in the literature with somewhat analogous results, but in most of these the administration of thyroid seemed not only to produce exophthalmos but also to initiate hyperthyroidism

BLOOD IODINE

Clinical application of measurements of iodine metabolism has been delayed by the technical difficulty of determining the small quantities of iodine involved with accuracy. Nevertheless, distinct progress has been made. The chief contributions in America have been the reports of Curtis and his associates. A summary of iodine metabolism was presented by Curtis before the American College of Surgeons in November, 1935. This may be abstracted as follows:

The normal human thyroid gland contains about 0.12 mgm of iodine at a concentration of 40 mgm per cent wet weight. In patients with exophthalmic goiter the thyroid iodine is decreased. It may be as low as 3 mgm. During iodolization, iodine storage in the gland occurs. The total blood iodine increases, but the organic blood iodine (probably hormonal) decreases, indicating a decrease in the production of hormone corresponding to the falling metabolic rate.

The normal iodine content of human blood is about 0.012 mgm per 100 c cm, that is, 12 micrograms or 12 gamma per cent. This may be separated into organic (hormonal) and inorganic (nutritional) fractions by alcohol precipitation.

In hyperthyroidism the blood iodine is increased, but 10 per cent of the determinations may fall within the normal range. In cases of hyperplastic goiter the average increase is to 27 micrograms per cent, and in those of nodular goiter, to 22 micrograms per cent. The increase occurs principally in the organic fraction. In the cases of patients not given iodine, thyroidectomy is followed by an immediate rise in the blood iodine, whereas in the cases of patients treated with Lugol's solution it is usually followed by a decrease in the very high blood-iodine values. The blood iodine relationships in toxic nodular goiter are similar to those in exophthalmic goiter. There is no constant and specific correlation between the blood iodine and the basal metabolic rate. In general, both are increased in hyperthyroidism.

In patients with hypothyroidism who have not received medication the blood iodine is decreased. After total thyroidectomy for heart disease there is a transient increase in the blood iodine for twenty-four hours, followed by a progressive decrease to about one-third of the normal amount, that is, to 4 micrograms per cent.

The daily loss of iodine in the urine of normal individuals is variable. The average on a hospital diet free from foods with a high iodine content was found to be 55 micrograms. In hyperthyroidism there is an iodine diabetes with an average daily excretion of from 150 to 300 micrograms of iodine in the urine (Curtis and Phillips). In cases of diffuse non-toxic colloid goiter the urinary iodine is normal. During menstruation, an increase in the blood iodine and urinary iodine is found. This may be related to iodine deficiency and explain the greater incidence of goiter in women than in men.

McCullagh has perfected a new technique for blood-iodine determinations. However, it remains a task of three hours and requires extensive equipment. McCullagh's data emphasize the variation of the blood-iodine values from the metabolic rate. In 1934, Perkin, Brown, and Lang described an iodine-tolerance test based on the greater absorption of ingested iodine by the hyperplastic thyroid gland. This was studied in relation to both the urinary excretion of iodine and the blood-iodine level. Watson modified the test of Perkin, Brown, and Lang by injecting iodine intravenously and determining the subsequent diminution of the artificially raised blood iodine. In hyperthyroidism the rate of the reduction is increased. Yakobson and Tschernyak have arrived at similar conclusions.

IMPEDANCE ANGLE

Brazier, in an essay awarded the first prize of the American Association for the Study of Goiter in 1934, described the apparatus for, and the technique of, measurement of the dielectric loss angle of the human body. This was called the "impedance angle", and the electrical measurements were translated into an arbitrary clinical scale of units above (+) or below (-) the values found in normal persons. After extended study Brazier concluded that in thyrotoxicosis the impedance angle varies in such a way as to be of diagnostic value. On the other hand, she stated that it is not dependent on the basal metabolic rate although only thyroid extract and thyroxin have an effect upon it. Following thyroidectomy for hyperthyroidism the raised impedance angle decreases to below the normal level and then gradually returns to the normal level, that is, it behaves in a way similar to the basal metabolic rate curve. In myxedema, the impedance angle is depressed and rises with the administration of thyroid. Saunton, Dausset, and Lamv, using an apparatus similar to that employed by Brazier, found an increase in the impedance angle in hyperthyroidism. However, their final report will be

withheld until observations on thyroidectomized patients can be made. In the cases of normal persons they found that the impedance angle was increased by thyroxin but not by ephedrin, pilocarpin, or atropin, their findings therefore corroborating those of Brazier. Barnett described a modification of the apparatus. Robertson and Wilson, using the Brazier apparatus, were unable to confirm Brazier's clinical results. They summarize their study as follows:

"1. In 8 consecutive cases of typical Graves' disease, the impedance angle was found to be outside the normal limits in the direction indicated by Brazier.

"2. In these 8 cases pre-operative iodine medication caused no alteration of the impedance angle although this treatment produced, in all, clinical improvement, fall in pulse rate, and fall in basal metabolic rate.

"3. In 4 cases of Graves' disease studied before and from nine to fourteen days after subtotal thyroidectomy, no alteration was found in the impedance angle although the operation was followed by a fall of basal metabolic rate and pulse rate, and clinical improvement.

"4. In 2 cases of well marked myxedema the impedance angle was found to be normal. Treatment with thyroid extract produced no alteration in the impedance angle.

"5. Exercise producing an increase of 200 per cent in the O_2 consumption, increased the impedance angle by only 10 Brazier units, i.e., 7 per cent.

"6. In cats there is no significant change in the impedance angle after death.

"7. It appears from these results that determination of the impedance angle is of no value in assessing the clinical progress of cases of Graves' disease or myxedema.

Using a different apparatus, Horton, Van Ravenswaay, Hertz, and Thorn were unable to confirm Brazier's observations. They concluded that marked alterations in the metabolic rates in thyrotoxic and myxedematous patients under treatment are not regularly associated with changes in the impedance angle, and that determination of the impedance angle is of little aid in the estimation of the level of thyroid activity.

In a discussion before the Central Society for Clinical Research in November, 1935, Johnston stated that he had found changes in the impedance angle in hyperthyroidism similar to those noted by Brazier. Freund stated that his results were not satisfactory, and that he had found the angle to be modified by changes in the level of the blood chlorides.

In an article to appear in *Endocrinology*, Brazier will report a comparative study of the internal impedance as measured by the method of Horton and Van Ravenswaay, and of the impedance angle as measured by the Brazier technique. According to Brazier, the latter is significantly altered in thyroid disease, while the former is not.

TOTAL THYROIDECTOMY FOR HEART DISEASE

The rationale of total thyroidectomy for cardiac insufficiency was reviewed by Levine and Eppinger. The clinical observation of marked improvement in patients with hyperthyroidism and heart failure following subtotal thyroidectomy, the cardiac benefit accompanying the suppression of hyperthyroidism by Lugol's solution, the production of angina in myxedematous patients by the administration of thyroid, and the "occurrence of striking improvement following subtotal thyroidectomy for supposed hyperthyroidism in a patient with advanced congestive heart failure, in whom the thyroid gland was normal," led Levine and his associates to advocate total thyroidectomy for cardiac disease. The first total thyroidectomy for a cardiac condition was performed at the Peter Bent Brigham Hospital, Boston, by Cutler on December 14, 1932. Levine and Eppinger expressed the opinion that the physiological explanation for the benefit resulting in some cases is not yet satisfactory. They concluded that the only effect that could have been anticipated from the physiological studies was a further slowing of the circulation, which might have been harmful.

In October, 1934, Mixter, Blumgart, and Berlin reported on 75 patients who were treated by total ablation of the thyroid for heart disease during the preceding eighteen months. The mortality was lower in the later than in the earlier months chiefly because of better selection of the patients. During the time this group was treated, 150 others were studied but were not selected for operation. Other factors in the lowering of the operative mortality were the substitution of local for general anesthesia and reduction of pre-operative and postoperative sedation, whereby the cough reflex was maintained. Mixter, Blumgart, and Berlin discussed also problems in surgical technique. They stated that the failure of subtotal thyroidectomy to relieve cardiac symptoms was established in 1932. This is due to maintenance of the metabolic rate by the remnant tissue. X-ray irradiation fails to inactivate the remnant tissue.

A careful study of the effect of x-ray irradiation of the normal thyroid in cardiac conditions as a possible substitute for surgery was made by

Friedman and Blumgart In 6 patients, 2 of whom had had maximal subtotal thyroidectomies, no lowering of the metabolic rate could be obtained

In an article published in 1933, Blumgart, Levine, and Berlin stated that subtotal thyroidectomy results in only transient relief which parallels the transient depression of the metabolic rate. A permanent beneficial effect is not to be expected until the metabolic rate has fallen 20 per cent or more. This requires three or four weeks. If compensation cannot be obtained by rest in bed, the administration of digitals, and other measures, operation is futile and contra indicated. This conclusion accords well with that of Means, who reported that in very far advanced cases his results from operation were poor. Mixer concluded that, in properly selected cases of angina pectoris, operative treatment is, in general, of definite value. He stated that a basal metabolic rate below -15 precludes distinct benefit from thyroidectomy and is a definite contra-indication to the operation. Of 23 patients treated by thyroidectomy for angina, 35 per cent were completely relieved, 50 per cent showed moderate improvement, and 15 per cent (all with a low metabolic rate) showed no improvement. There was no operative mortality. Of 46 patients with congestive failure, 55 per cent showed distinct improvement, 26 per cent, moderate improvement, and 7 per cent, no improvement. The operative mortality was 12 per cent. After the operation, rest in bed until the metabolic rate has fallen to at least 20 per cent below the pre-operative level is necessary. Mixer concluded that the indiscriminate application of complete thyroidectomy to improperly selected and inadequately prepared cardiac cases will unquestionably be followed by an alarming postoperative mortality and an incidence of failure so high as to throw the procedure into disrepute.

In June, 1934, Blumgart and Davis reported the metabolic observations made in the 75 cases of heart disease treated by total ablation of the thyroid that were first reported by Mixer, Blumgart, and Berlin. The basal metabolic rate showed an appreciable fall by the end of the first post-operative week and reached its lowest value between the third and eighth weeks. As a rule the lowest value was between -25 and -35 per cent, but in 5 cases it ranged from -41 to -47 per cent. Clinical signs of myxedema appeared in 90 per cent of the patients from two to six months after the operation. The blood cholesterol began to rise soon after the operation and sometimes continued to rise for several months after the

metabolic rate had reached its lowest level. Myxedematous symptoms appeared when the blood cholesterol reached 300 mgm per cent. Thyroid medication was directed only toward relief of the more distressing symptoms of myxedema, and not toward elevation of the metabolic rate or reduction of the blood cholesterol. The required dosage varied from $1/10$ to $3/4$ gr of desiccated thyroid. When this amount was given the symptoms of myxedema were ameliorated although the metabolic rate remained in the neighborhood of -25 per cent.

Blumgart, Riseman, Davis, and Weinstein reported the results in the 36 cases of arteriosclerotic heart disease which were included in the series of 75 treated by total ablation of the thyroid. Twenty of the patients became able to work, 10 full time and 10 part time, 6 remained unable to work, and 5 were operated upon too recently for the results to be known. There were 3 postoperative deaths and 2 later deaths.

Levine and Eppinger presented an exhaustive analysis of the results of total thyroidectomy in 12 cases of intractable heart disease in which total thyroidectomy was performed in 1932 or 1933, and 30 cases in which it was performed in 1934. In the first group the heart disease was extremely far advanced and 6 of the 9 patients who survived the operation died of heart disease within nine months. Levine and Eppinger stated that in the selection of cases several groups are recognized. In angina pectoris the specific criteria of aid in the selection are the frequency and severity of the attacks and the extent to which they are making life intolerable. There is as yet no evidence that total thyroidectomy prolongs life in angina pectoris, and subsequent coronary thrombosis has not been prevented by the operation. Hence, prolongation of life and the prevention of coronary thrombosis cannot be accepted as indications for removal of the thyroid. The level of the blood pressure, a previous history of coronary thrombosis, unless too recent, and abnormalities in the electrocardiogram have not been important factors in selection. In cases of congestive heart failure, there are obvious contra-indications to thyroidectomy, viz (1) active carditis, (2) renal insufficiency independent of passive congestion, (3) cirrhosis of the liver, (4) a severe, unrelated handicap such as hemiplegia, and (5) aortic stenosis or luetic aortic insufficiency. Cases of mitral stenosis and hypertension associated with congestive heart failure are more suitable for the operation. Auricular fibrillation is not a contra-indication. In 23 cases of angina pectoris in which complete extirpation of the thyroid gland was

performed there were 2 deaths associated with the operation. Of the surviving 21 patients, 9 had an excellent result, 7, a good result, 4, a moderately good result and 1 a fair result. However, 5 died of coronary thrombosis from five days to sixteen months after the operation.

When the signs of myxedema appeared following the thyroidectomy, thyroid was administered. These signs were noted from thirty-eight to ninety-four days after the operation. The average basal metabolic rate was then -23 per cent. On the administration of thyroid it rose to -16 per cent and the velocity of the blood flow as measured by the sodium cyanide method decreased from twenty to thirty-two seconds. Unlike the cases of congestive failure, every case of angina showed a consistent slowing of the speed of circulation after the operation as the metabolic rate fell. The blood cholesterol rose from 260 mgm per cent before the operation to 488 at the time of clinical myxedema, and under thyroid medication it fell to an average of 329. Careful measurement of the size of the heart indicated a slight persistent postoperative increase attributable to residual myxedema. The average blood pressure in the group increased postoperatively, the systolic pressure rising from 152 to 165, and the diastolic of from 90 to 93 mm of mercury. This increase may be attributed to increased activity. There were no significant variations. Twenty-three patients with angina pectoris had a postoperative gain of weight of from 6.74 to 73.2 kgm. During the first three months after the operation there was no anemia. In cases of angina pectoris the vital capacity of the lungs was unchanged postoperatively. No change in the electrocardiogram characteristic of myxedema was allowed to occur.

There were 7 cases of congestive heart failure. The results were excellent in 3, good in 2, fair in 1, and poor in 1. In congestive failure the preoperative condition is more variable and evidence of improvement after operation is less definite. Hence positive determinations of the effect of total thyroidectomy is less certain. In the reviewed cases thyroid extract was administered for myxedema as soon as it appeared. The average time of its appearance was the sixty-eighth day after operation when the basal metabolism was -24 per cent. Changes in the velocity of the blood flow in congestive heart failure subsequent to complete thyroidectomy are by no means constant. In 1 of the reviewed cases the velocity increased with a simultaneous marked fall in the metabolic rate and the patient showed striking improvement. There was no significant

change in the vital capacity postoperatively although dyspnea was reduced because the oxygen requirement was decreased. The changes in the size of the heart were inconstant. The blood pressure average was raised postoperatively.

Cutler presented the results in a series of 54 cases, including those reviewed previously by Levine and Eppinger. In 23 cases of cardiac decompensation, 15 due to valvular disease and 8 to myocardial disease, there were 2 immediate postoperative deaths and 6 later deaths unrelated to the operation. In 31 cases of angina pectoris there were 2 immediate postoperative deaths and 5 later deaths unrelated to the operation. Of the 54 patients, 5 developed parathyroid tetany and 4 had an injury of the recurrent laryngeal nerve. Cutler presented notes on the operative technique. The clinical results in 34 patients who were still alive more than three months after the operation were as follows: Of 12 with cardiac decompensation the results were excellent in 5, good in 4, and fair in 3. Of 22 with angina pectoris, they were excellent in 12, good in 4, and fair in 6. In animal work the Sutton-Lueth coronary occlusion technique was used. In animals subjected to this procedure the administration of adrenalin caused pain. Cutler expressed the opinion that thyroidectomy may interfere with the patient's sensitivity to his own adrenalin. He cited the work of Blumgart.

Berlin reported the cases of 90 patients observed from one to two and one-half years after total thyroidectomy for heart disease. In regard to the selection of patients for this operation he stated that only those who, despite all available medical measures, continue to remain chronic invalids should be chosen. In general, patients with slowly progressive heart disease who continue to suffer recurrent attacks of cardiac failure on exertion over a prolonged period of time will probably respond to the operation favorably, but those showing a short and rapidly progressive course should not be subjected to it. The operation is contra-indicated also in the presence of severe impairment of renal function, acute pulmonary infection or active rheumatic infection. The same consideration of the rapidity of the course of the condition should govern the selection of cases of angina. If the patient's history shows a rapid increase in the number of attacks, thyroidectomy will probably not give lasting results. When the metabolism is -15 per cent, operation should not be recommended. Of Berlin's patients with angina pectoris or congestive failure who were operated upon from one to two and one-half years ago approximately 70 per cent showed

marked or moderate improvement following the total ablation of the thyroid gland. In the last 62 cases there was no operative mortality. Berlin called attention to the danger of bilateral injury of the recurrent laryngeal nerve and advised laryngoscopic examination after the ablation of one lobe.

Clark, Means, and Sprague of the Massachusetts General Hospital wished to determine for themselves the practicability and usefulness of total thyroidectomy for the treatment of heart disease in a large general hospital without unduly elaborate special service set-ups, without special technicians or nurses working on the problem, and without special added expense. They reported a study of 21 patients operated upon between July, 1933, and May, 1935. Nineteen of the patients were treated for congestive failure and 2 for angina pectoris. From the experience in these cases the conclusion was drawn that the operation is definitely contra-indicated for patients of the following types: (1) those who have not been given the benefit of entirely adequate medical treatment over a sufficient period of time for full evaluation of its results, (2) those showing rapid progression of the cardiac condition in spite of adequate medical care, (3) those with such severe heart disease that they are unable to establish and maintain compensation under treatment with digitalis and bed rest, (4) those with high grade mitral stenosis or other mechanical obstruction giving rise to a high venous pressure sustained after the restoration of compensation, (5) those with a low pre-operative basal metabolism, (6) those with chronic pulmonary disease of any type, (7) those with severe nephritis, (8) those with malignant or severe hypertension, especially if the latter is associated with generalized arteriosclerosis, (9) those with active rheumatic infection, bacterial endocarditis, or other concomitant infection, (10) those who have had coronary thrombosis within six months, and (11) those with status angiosus.

At the time of the report, the results in the patients who were still living were as follows: One patient, no recurrence of signs or symptoms, and increased activity, 3 patients, moderate improvement, that is, symptoms less severe with increased activity, 5 patients, slight improvement, that is, symptoms less severe without increased activity, 12 patients, no improvement. Fifteen of the 21 patients were dead. In about one fourth of the entire series of cases the operation was considered worth while, in three fourths it was not. The authors of the report believe that the relatively poor results depended to a

considerable degree upon the difficulty in the selection of the cases and the choice, at first, of cases that were too severe. They stated that there is a small group of cases of cardiac failure in which medical therapy fails to control the progressive loss of cardiac reserve and total thyroidectomy offers an even chance of worth-while improvement.

Hertzler approached the problem quite differently. He questioned the normal character of the thyroids removed in cases of cardiac disease and attributed the improvement following thyroidectomy, not to reduction of the oxygen requirement (Blumgart) or of adrenal synergism (Levine), but to the removal of thyrogenous toxins. He said, "When a heart lesion is helped by the total removal of the thyroid, the gland is not normal. One may use the effect the removal of the thyroid has on the heart as a measure to determine whether the thyroid was toxic or not."

Numerous short reports of studies similar to those of the various Boston groups of investigators have appeared.

Hepburn reported 5 cases of angina pectoris in which total thyroidectomy was beneficial, but 4 cases of congestive failure in which it was performed with operative death, postoperative death, no improvement, and only temporary improvement in 1 case each.

Kahn reported 9 cases of heart disease treated by total thyroidectomy with the following results: Two cases of angina complete relief. One case of angina and congestive heart failure good relief of the pain but no relief of the decompensation. Six cases of recurrent congestive failure marked improvement in 3, moderate relief followed by death four weeks after the operation in 1, and no relief, with death thirty hours after the operation in 1.

Pratt reported 17 cases. He said, "all but 2 of the patients have shown complete relief of symptoms." This seems an extraordinarily sweeping statement.

Bankoff reported 20 cases. He said that all of them showed persistent improvement after total removal of the thyroid gland, and that no death has been reported.

Lian, Welti, and Facquet reported 3 cases of rheumatic heart disease in which improvement followed total thyroidectomy.

Donati and Cantoni reported 1 case with improvement.

Brenner reported improvement in 7 cases. Boothby and Rynearson, using the Grollman modification of the Frick principle, made observations of the blood flow in liters per square meter

per minute in the cases of 7 women and 4 men with exophthalmic goiter. From their own data and 2 comparable series of data reported later by other investigators they drew the following conclusions:

1 The circulation rate is increased in exophthalmic goiter.

2 On the average, the greater the intensity of the disease as indicated by oxygen consumption the greater the increase in the circulation rate.

3 According to the findings of Liljestrand and Stenhielm, the increase in the circulation rate in patients with exophthalmic goiter who are not being treated with iodine is much greater than that occurring in normal persons as the result of an equal increase in oxygen consumption due to work. This suggests that, in thyrotoxicosis, the increased oxygen consumption is accompanied by additional factors or mechanisms affecting the circulation other than those present with an increase in the oxygen consumption caused by work in normal subjects.

TOTAL THYROIDECTOMY FOR DIABETES

Wilder, Foster, and Pemberton reported the case of a diabetic patient who was subjected to total ablation of the thyroid. This operation was done because of the great improvement which occurs in diabetes associated with hyperthyroidism after surgical control of the latter condition. Its results were reported as follows: "Although the patient's tolerance was greatly improved, the remedial result was not sufficient to justify recommending the procedure as a treatment for diabetes. A careful diet and small doses of insulin continue to be necessary six months after the total thyroidectomy was performed, and the patient complains that sensitiveness to cold and lack of endurance are so disturbing that the advantage of an improved tolerance is not appreciated." Rudy, Blumgart, and Berlin reported a case of severe, unmanageable diabetes complicated by tuberculosis in which improvement followed total thyroidectomy.

CALCULATION OF THE METABOLIC RATE BY FORMULAS

Frank reviewed the formulas of Read, Gale and Jenkins, and Read and Barnett for estimating the metabolic rate from the pulse rate and blood pressure, and reported his own results. He summarized his work and conclusions as follows:

"1. A comparison of basal metabolic rates obtained by indirect calorimetry (Douglas bag and Haldane bag analysis) and by Read's, modified

Read's, and Gale's formulae has been made on 250 patients.

"2. There is a large margin of inaccuracy in the formulae determination, in only approximately one fifth of the cases was there an error less than 5 per cent, whilst in over 30 per cent of the cases there was more than 20 per cent error, it was noted that very frequently when low basal metabolic rates were obtained by gas analysis the formula gave higher readings, the reverse occurred in hyperthyroidism and here lower readings were frequently observed.

"3. The gasometric analysis for determination of the basal metabolism rate cannot be supplanted or replaced by formulae."

THYROTROPIC PITUITARY HORMONE

Credit for the discovery of the thyrotropic pituitary hormone must go to the anatomists, P. E. and I. P. Smith (1922), Hogen (1922), Spaul (1923), and Uhlenbuth and Schwartzbach (1928). All subsequent physiological and pathological studies owe their direction to the earlier studies of these investigators.

During the year 1935 the physiology of the anterior pituitary thyrotropic hormone was carefully reviewed by Collip. Loeb's work on this hormone was reported in the Phillips Memorial Prize Oration of the American College of Physicians. To explain the rapid loss of effectiveness of a number of anterior pituitary hormones on continued injection, Collip postulated the occurrence of anti hormones, but during the past year there have been reports of findings which indicate that this theory is not applicable to growth or gonadotropic hormones. Very recently Werner reported results of studies of the thyrotropic hormone indicating that the refractoriness is due to the nature of the extract administered.

The clinical application of thyrotropic hormone was briefly reviewed by Starr as follows:

"Schuttenhelm and Eisler reported the effect of a thyrotropic pituitary hormone in human beings in June, 1932. The metabolic rate of a healthy young woman rose 20 per cent. Eitel and Loeser studied the effect of a Schering Kahlbaum thyrotropic preparation. From 200 to 300 guinea pig units per day in patients gave uncertain results, but a dosage of 600 units a day caused a rise from +15 to +42 per cent in seven days. Ten patients were referred to. The dosage values are to be compared with those indicated later. Schuttenhelm and Eisler later reported that a man with a post thyroidectomy myxedema sustained no rise in basal metabolic rate with 10 daily injections of 600 guinea pig units of thyro-

tropic hormone, but during this time the blood iodine concentration rose from 6 to 16 gamma per cent. In a puerperal obese patient, four series of injections led to no increase of metabolic rate, but a loss of ten pounds in weight occurred in a month. Muller gave from 200 to 600 guinea pig units of the Schering-Kahlbaum preparation daily to several patients in the later months of pregnancy with no observable effects. A thorough study of the acute effects of Schering-Kahlbaum and of the I G Farbenindustrie thyreotropic preparations was reported by Feuling. Twenty-eight patients receiving four daily injections of Schering-Kahlbaum thyreotropic preparation sustained an average rise in basal metabolic rate of 15 per cent, 29 patients receiving the I G preparation sustained an average rise of 19 per cent. No prolonged experiments were conducted. Wachtstein reported two significant cases. A patient with myxedema was very susceptible to the first series of thyreotropic injections, moderately reactive to the second series a month later, but unresponsive to the third series of large doses given in the third month. This may be the first report of refractoriness to thyreotropic medication in a human being. A case of hypophyseal cachexia did not respond to the same medication. Thompson, using Squibb's growth hormone preparation and Wilson's Phylene, found a rise of basal metabolic rate in 24 of 39 patients. He pointed out that the complete myxedema patients failed to respond, while the symptoms and metabolic rates of patients with hyperthyroidism were increased. Lederer reported two cases of Simmond's disease treated with a thyreotropic preparation, preglandol, Roche, the metabolic rate rose during treatment, but from three weeks to a month after treatment fell to even lower levels than had been present originally."

As a result of observations on 24 patients treated with a proprietary thyrotropic pituitary preparation, Starr concluded "The thyroid stimulating effects in man are extremely variable, some individuals being very sensitive, others giving no response to the same dose and preparation. Patients with hyperthyroidism sustain an exacerbation of symptoms and rise of metabolic rate, which may be prevented by simultaneous administration of iodine. Patients with myxedema give no response. In all patients, with the preparations used, the effects have been temporary. The recent work of Werner and Smith indicates that this is due to the character of the extract given and that non immunizing extracts can be made. At present the clinical value of thyreotropic hormone is unknown."

CANCER OF THE THYROID

The problem of the incidence of malignancy of the thyroid is raised by the statement of Dinsmore and Crile that the estimated incidence of pre-operatively undiagnosed malignancy in nodular goiters is about 2 per cent. Among 1,053 cases of goiter in which operation was performed during 1929 in the Cleveland Clinic there were 20 cases of primary malignant tumors. Of the latter, malignancy was suspected before operation in only 9. A similar incidence was reported by Mulvihill, who compared the frequency and character of thyroid malignancy in Berlin and on Long Island. However, the criteria of the condition in these two localities seem to be quite different. In a large proportion of the Berlin cases the malignancy was clinically evident before operation, whereas in the American cases the microscopic characteristics were relied upon for the diagnosis. The 2 per cent incidence of malignancy in nodular goiter was discovered by microscopic study. Shallow, Lemmon, and Saleeby reported that in 1,096 cases observed at the Jefferson Hospital, Philadelphia, in the period from 1923 to 1933 the incidence of malignancy was 2.18 per cent.

A valuable report of the clinical and pathological characteristics of 42 cases of thyroid malignancy studied at the New York Hospital during a period of thirteen years was published by Smith, Pool, and Olcott. These were found among 1,600 cases in which a thyroid operation was performed. The incidence of malignancy was therefore 2.5 per cent. An incidence of 1.68 per cent was reported by Smith from the Lahey Clinic in 1929, and an incidence of 1.6 per cent in the period from 1910 to 1916 from the Mayo Clinic. A similar incidence was reported by Graham from the Cleveland Clinic, and by Haagensen from the Memorial Hospital, New York.

An analysis presented in 1935 by Clute and Warren, in which the assumption of malignancy based on the findings of microscopic examination was compared with the clinical fact of malignancy, is important. Of 1,114 patients with adenomas, 3.1 per cent showed varying degrees of epithelial invasion of the blood vessels, but the fact that only 10 per cent of the latter died of metastases suggests that the incidence of malignancy was 0.3 per cent. Clute and Warren stated that in cases in which microscopic examination reveals only evidence of invasion there is a 95 per cent chance that the tumor is not malignant. In 1931, they reported the incidence of thyroid cancer in the Lahey Clinic. Of 6,535 patients operated upon for disease of the thyroid gland in the period

from 1916 to 1930, a microscopic diagnosis of malignancy was made in the cases of 187 (2.86 per cent). In 127 of the latter the presence of malignancy was doubtful because they survived. If these may be subtracted, the incidence of malignancy was 0.95 per cent.

No accurate data on the incidence of cancer in nodular goiter in the population as a whole are available. It seems hardly likely that it is as high as 1 per cent. If it were, many more cases of advanced, evident thyroid cancer would be seen in general medical work.

A discussion of thyroid malignancy by Clute and Warren seems worth quoting. 'Thyroid malignancy is suspected, then, because of a firm hard, discrete type of tumor in the thyroid gland, because of recent growth, either slow or rapid, and because of secondary evidences of pressure such as difficulty in swallowing and breathing, and hoarseness. Thyroid malignancy soon leaves the normal contour of the thyroid gland to grow in an irregular and unrestrained manner and to become adherent to adjacent structures. In a few cases the presence of enlarged lymph nodes near the goiter is suggestive of the presence of malignancy. In rare cases bone metastases may be the first indication of the presence of malignancy in an apparently benign adenoma.'

In the 226 cases studied, 198 were females and 28 males, an incidence of 7 females to 1 male. The incidence of thyroid disease is in general much greater in women than in men. During the past five years, 4,770 patients were operated upon for goiter. Of these, 648 were men—an incidence of 7 females to 1 male for all thyroid disease. The similarity in these figures is impressive and may indicate the common origin of cancer in previously diseased thyroids.

Cancer of the thyroid while appearing most commonly in middle life may nevertheless appear at any age. The youngest patient in this series was 9 years of age. Increasing experience with thyroid malignancy has demonstrated to us the great fallacy of thinking that youthfulness of the patient precludes the presence of cancer of the thyroid. Of our patients 8 were 20 years of age or less, and two of these have died of cancer, one aged 9 and one aged 13. Furthermore, 39 of our patients (or 16 per cent) were less than 31 years of age, and 77, or more than one-third of all our patients, were less than 41 years of age. The age distribution chart shows that there is a preponderance of group I thyroid tumors in the age of greatest sex activity, the great majority of these patients being 20 to 50 years of age. No such marked association with the active repro-

ductive period is noted in the more malignant tumors of Group II and III which, in fact, tend to be more common after middle life.

'It has been stated by different writers on cancer of the thyroid that an adenoma of the thyroid or an adenomatous goiter preceded the malignancy in 90 per cent or more of all cases of thyroid cancer. We have attempted to obtain accurate figures as to the presence of a pre-existing goiter in our group of cases. Such figures, however, are open to a certain amount of question because of fallacious observations by patients. In many cases, however, the pathology of the gland establishes the presence of an antecedent adenoma. We may generalize from this series and say that a goiter was almost invariably present for an appreciable time before operation in the patients of groups I and II. In group III, however, we find that often no goiter was noted longer than a few weeks or months before operation.

'Cancer may occur coincidentally with exophthalmic goiter. We have in our records four cases of exophthalmic goiter and coincident malignancy of the thyroid gland. In these cases it is our belief that the malignancy occurred in a coincident adenoma in the hyperplastic gland, but that the hyperthyroidism was related only to the presence of hyperplasia in the otherwise normal thyroid tissue.

'We have no evidence that hyperthyroidism arises as a result of the activity of malignant thyroid tissue itself. There is, however, evidence that some thyroid malignancies have secretory power. The classical example of function is afforded by Eiselsberg, who reported the development of hypothyroidism in a woman after complete excision of an adenomatous thyroid gland. With the development of a large nodule in the sternum the hypothyroid symptoms disappeared but on removal of the sternal nodule, which proved to be a metastatic adenocarcinoma of the thyroid, she again became hypothyroid. The presence of active principle in the tissue of struma ovarii has also been well established.'

With regard to the prognosis, Clute and Warren classify thyroid cancers as follows:

Group 1. Those of low or potential malignancy. Histological examination shows either an adenoma with blood vessel invasion or a papillary cystadenoma with blood vessel or capsule invasion. Of the authors' patients, 7 per cent are dead of thyroid cancer or have a recurrence. No death or recurrence has occurred in any case in which there was no trouble for a year after operation.

Group 2 Those of clear cut, definite malignancy for which there is some hope of cure and much chance of long relief. Histologically, all are adenocarcinomas. In the reviewed cases the mortality was 55 per cent and many deaths occurred from the cancer years after the original operation.

Group 3 Those of the clinically most hopeless type. Histologically, this group includes the squamous-cell, the small cell, and the giant-cell cancers, and the fibrosarcomas. All of these tumors grow rapidly, occur most frequently in middle and later life, and are usually rapidly fatal. The mortality is 80 per cent, and most of the deaths occur within a few months after operation.

Herbert reported a study of 41 cases of thyroid malignancy, giving the pathological classification, clinical outcome, and prognosis. He distinguished 4 types of such malignancy: (1) forms transitional between goiter and a malignant neoplasm, (2) typical vegetating epitheliomas, (3) atypical epitheliomas, and (4) heterotypical neoplasms.

In 1934, Wegelin presented a detailed discussion of the pathological anatomy of thyroid malignancy and emphasized the following points:

- 1 The incidence of malignancy of the thyroid is much greater in goiter areas than in others.
- 2 Thyroid adenoma is potentially malignant.
- 3 It metastasizes by way of the blood vessels.
- 4 It is not a true carcinoma.
- 5 Proliferative adenoma is a true carcinoma metastasizing by way of the lymph vessels.
- 6 Another form is the papillomatous tumor. This may be benign. When it is malignant, it metastasizes by way of the blood vessels. It may develop from the parathyroids.

7 Other varieties of malignancy arise from the connective tissue and blood vessels.

In conclusion, Wegelin stated that thyroid adenoma must be considered a precancerous condition since most malignant tumors of the thyroid develop from it. As a rule it is accompanied by disturbance of thyroid function. Operation is therefore indicated.

A comprehensive and important discussion of the diagnosis and treatment of thyroid malignancy was opened by De Quervain with the statement that the general proportion of malignant to benign goiter has not been established since treatment is not sought for all varieties of goiter. In the Bern Clinic the incidence of malignancy is 4 per cent. De Quervain described the technique and reported the results of radical operation combined with radium implantation. Of 43 patients subjected to radical operation in the

period from 1918 to 1931, 54 per cent were still living at the end of three or more years after the operation, 31 per cent at the end of five years, and 14 per cent at the end of fourteen years.

Pemberton reviewed the results of treatment of cancer of the thyroid. The pathological grouping used at the Mayo Clinic for many years is as follows: (1) papillary adenocarcinoma, (2) adenocarcinoma in fetal adenoma, (3) diffuse adenocarcinoma, (4) epithelioma, and (5) sarcoma. It was estimated that, of 276 cases, the malignant neoplasm originated in a pre-existing goiter in 87 per cent. In discussing the various pathological forms, Pemberton stated that the distinguishing clinical features of papillary adenocarcinoma are a low grade of malignancy and a tendency of the disease to spread to regional lymphatic structures, where it may be confined without further dissemination for many years. Metastasis to the cervical lymph nodes is not a criterion of inoperability in this type of cancer since radical surgical removal of the primary lesion together with the involved nodes, supplemented by postoperative irradiation, offers a good chance for cure. The essential clinical features of adenocarcinoma in fetal adenoma are, commonly, a low grade of malignancy and a tendency toward early dissemination of the carcinoma by way of the blood stream. Since lymph vessels are not involved until after the carcinoma has invaded the capsule, the presence of cervical metastasis has a far graver prognostic significance in this type than in the former type. Diffuse adenocarcinomas of the thyroid gland are of higher grades of malignancy than the preceding types and behave as diffuse adenocarcinomas situated elsewhere. Squamous epithelioma is rare and highly malignant.

In discussing the choice of surgical procedure in relation to the character of the malignancy, Pemberton stated that in his opinion the threat of malignancy indicates the removal of all tumors of the thyroid gland. Of a series of 323 patients, 56 were subjected only to biopsy of the tumor followed by irradiation treatment, and 267 to thyroidectomy with or without removal of the cervical lymph nodes. Eleven patients died in the hospital. Of the remaining 312, 137 (43.9 per cent) had survived five years or longer by the end of 1928. Even of 134 patients in whom malignancy was suspected pre-operatively, 25 per cent had survived five years or longer, and of those requiring block dissection of cervical lymph vessels, 50 per cent were living and well from one to eleven years after the operation.

Huguenin, Welti, and Placa recommended that goiter tissue be examined microscopically during

operation in order that a more radical operation may be performed if malignancy is found

A report by Potter and Morris of 5 cases of carcinoma of the thyroid in persons under twenty years of age emphasized the fact that thyroid malignancy may occur in the younger age groups

THYROIDITIS

Boyden, Collier, and Bugher discussed Riedel's struma. They found the changes of this condition in 9 of the specimens removed in 2,500 consecutive thyroidectomies. Lee collected 12 cases. He concluded that the fibrous and lymphoid types are probably distinct diseases. Conservative partial resection is the recommended treatment. Both articles include extensive bibliographies. Clute, Eckerson, and Warren described the clinical course and pathological characteristics of struma lymphomatosa in 9 patients.

LINGUAL THYROID

A comprehensive review of lingual thyroid has recently been published by Montgomery. This may be abstracted as follows:

The term "lingual thyroid" refers to thyroid occurring at the base of the tongue. A very rare form, of which only 2 cases are known, is that in which the thyroid is found in the body of the tongue. The first authentic case of lingual thyroid was reported by Bernays in 1888. In 1922, Dore reviewed the cases that had been reported up to that time and reported a case of his own. His patient was a hypothyroid woman in whom the tumor, probably a compensatory growth, appeared at the age of nineteen years. During her first and succeeding pregnancies, enlargement of the tumor occurred with thyroiditis due to a necrotic infection, and variation in the size of the mass occurred under iodine therapy. Biopsy of the tumor was done. Of the cases of lingual thyroid reported in the literature exclusive of cases of minute amounts of thyroid in the tongue associated with cysts of the thyroglossal duct, Montgomery accepted 144 as cases of true lingual thyroid. He read the original records of all except 1 case. A very complete tabulation of the series is included in his article. The chief symptoms were dysphagia and dysphonia. Dyspnea, pain, and hemorrhage were less frequent. Hyperthyroidism occurred occasionally. Thyroid insufficiency was noted in 21 cases. Montgomery discussed the relationships of lingual thyroid to ovarian function and reported the physical findings in cases of benign tumor. Data obtained at autopsy, operation, and careful clinical examination show that in from two-thirds to three-fourths

of cases of symptom producing lingual thyroid there is no thyroid in the normal location in the neck.

OVARIAN THYROID

Sanders reported a case in which a nodule of thyroid tissue was found in an ovarian cyst. His references indicate that the presence of such tissue in cysts of the ovary is much more frequent than has been supposed.

TREATMENT OF THYROID DISEASE

The remarks of Thompson, Taylor, and Meyer on the operative mortality in exophthalmic goiter, which are based on a study of the problem at the Cook County Hospital, Chicago, are well worth study. The reduction of mortality from operation depends on (1) the skill of the surgeon, and (2) the condition of the patient at the time of operation. "It is only necessary to compare the postoperative reactions of patients operated on by poor surgeons with those of patients operated on by skillful surgeons to be convinced of the importance of surgical skill." However, this difference is dependent upon not only technique but also surgical judgment. "The best surgeons have learned when to operate and when not to operate, as well as the extent of the surgical procedure their patients would tolerate. Before the days of iodine the best surgeons had a mortality of from 1 to 4 per cent, while the mortality as a whole varied from about 10 to 15 per cent. At present the best surgeons have a mortality from about 0.25 to 1 per cent, while the mortality throughout the country is much greater." Until very recently the mortality at Cook County Hospital has been 14 per cent, it has been reduced by cooperation between the medical and surgical staffs to about 4 per cent. "We consider that the single most important factor in the reduction in mortality has been the pre-operative condition of the patient. In order to get the patients in the best possible condition for operation it has been necessary to pay great attention not only to the administration of iodine, but also to emotional instability, muscle weakness, rest, diet, and infection."

The authors' comment on complete dependence on iodine is significant. "There has been a tendency to feel that as long as iodine was being given, little else mattered. It was claimed that it abolished crises and the need for multiple stage operations. With increasing experience, however, it was gradually learned that patients died from postoperative crises in spite of the administration of large doses of iodine and that it was still necessary to perform the operation in at least two stages in all patients in whom there was any doubt

about the ability to withstand surgery." It should be generally recognized that rigid adherence to operation at the end of from one to two weeks of iodine treatment should be abandoned. The danger of rapid relapse if the operation is delayed two or three weeks is slight. This additional time, even if the metabolic rate rises slightly, will allow recovery of strength, nutrition, nervous equilibrium, and cardiac reserve. Hurrying to operate at the first significant drop in the metabolic rate is dangerous. "It has been our impression that the single most important factor in gauging the ability of patients to withstand operative procedures is the degree of emotional instability, regardless of what happens to the basal metabolism. A thyroidectomy for exophthalmic goiter is never to be regarded as an emergency operation, and when it is done as such the outcome is usually not favorable." When marked muscle weakness is combined with emotional instability, operation should be delayed. "Provided patients will eat enough, they can always be made to gain." The caloric requirement to produce a gain is double the basal estimation—from 4,000 to 5,000 calories daily. No surgical procedure should be undertaken during a complicating infection. Cardiac decompensation necessitates delay but not indefinite postponement of operation. Cardiac irregularity, particularly auricular fibrillation, in the compensated heart is not an indication for delay.

Lahey also considered the factors leading to a low surgical mortality in hyperthyroidism. He said that the most important single factor related to the mortality of the surgery of hyperthyroidism is the preoperative decision as to how severe the thyroid intoxication is and as to whether the patient will probably require multiple stage procedures. This decision should be made and recorded when the patient is first seen, before toxicity is masked by rest, fluids, sedatives, and iodine. In another article Lahey emphasized the life-preserving character of the several stage surgical attack on hyperthyroidism and discussed the indications, procedures selected, time intervals required, and technique.

Crile insists on the individualization of patients with thyroid conditions who are being prepared for surgery. Conditions which, according to experience, point to an unsuccessful outcome are cardiac complications, substernal goiter, a flat pulse curve, old age, a severe degree of hyperthyroidism, and a pulse over 100 at the time of operation. By "flat pulse curve" is meant a pulse rate that does not decrease rapidly under preoperative preparation. In very serious cases Crile does a

"trial ligation" and "trial lobectomy." If the patient has no severe reaction to these partial procedures, the operation is completed in a few days. If the reaction is severe, iodine is continued, the patient is sent home for three months, and during the latter half of this period iodine is cautiously discontinued to allow a second iodine remission before the final surgical attack. Certain conditions are warnings of the possibility of postoperative crisis, namely, the "flat pulse curve," a high metabolic rate, psychosis, and severe hyperthyroidism. The temperature should be taken at least every two hours during the first two days after operation, and artificial cooling should be instituted if it reaches 102 degrees F.

Goetsch reported an operative mortality of 1.16 per cent in 3,610 thyroid operations on 5,321 patients in the period from 1920 to 1929. Of the 42 deaths, 17 (40 per cent) were due to postoperative crisis, 7 (17 per cent) to heart failure without crisis, 4, to pneumonia, 4, to embolism, and 7, to miscellaneous causes. "A very disturbing factor was found to be the indiscriminate treatment with iodine, which had in the great majority of instances produced an exacerbation of the pre-existing hyperthyroidism. Thus, of the 17 deaths occurring as a result of postoperative hyperthyroidism, there were only 2 in which iodine had not been indiscriminately administered previous to operation. With abundant evidence at hand, it seems safe to advise against all treatment with iodine in patients with hyperthyroidism. It does not cure, and it deprives the surgeon of one of his most reliable factors of safety, namely, the preoperative clinical remission otherwise obtainable by the first and efficient intensive treatment with iodine."

Clifton reported that in Atlanta, Georgia, during the five year period from 1929 to 1933, 827 patients with disturbances of the thyroid gland were operated upon with 22 deaths, a mortality of 2.66 per cent. Ten patients died in crisis seventy-two hours after the operation. The majority of these gave a history of having taken iodine indiscriminately before operation. Clifton urged the omission and resumption of iodine in such cases, and a longer period of preoperative rest and the adoption of multiple stage operation in serious cases.

Poer reported a series of 200 consecutive thyroidectomies performed in Atlanta, Georgia. Twenty-eight were performed for diffuse non-toxic goiter, 41, for nodular non-toxic goiter, 44, for nodular toxic goiter, 83, for diffuse toxic goiter, and 4, for thyroid malignancy. Three (1.5 per cent) of the patients died after the operation, 82.5

per cent were considered cured, 12.5 per cent were benefited, and 3.5 per cent developed recurrences.

Starlinger, of Vienna, reported a series of 290 cases of Basedow's disease treated surgically in the period from 1911 to 1930 with an operative mortality of 6.4 per cent. He emphasized that iodine resistant cases should be approached cautiously and treated by a multiple stage operation although in other cases a single stage bilateral resection is the operation of choice. The immediate preoperative preparation should be under the direction of the surgeon.

Beard, Colson, and Rapinsky discussed surgical technique and recommended that operation be performed under local anesthesia. Loicq outlined a surgical management of hyperthyroidism much like that favored in America. Of 88 patients, 70 per cent were absolutely well after this treatment, 13.5 per cent were relatively well, 11.5 per cent showed no improvement, 3.5 per cent developed recurrences, and 1.4 per cent died.

Tebroke, of Frankfurt, reported a follow up study of 719 patients subjected to thyroidectomy in the period from 1921 to 1931. Injuries of the recurrent laryngeal nerve occurred in 14 (unilateral in 9, bilateral in 1, and posticusparens in 4). Of 9 cases of parathyroid tetany 5 were slight. In 587 cases of non toxic goiter there were 4 operative deaths: 1 due to pulmonary embolus and 3 to uncertain respiratory infections. Of 25 patients with malignant goiter, 8 were still alive. In this condition postoperative irradiation treatment is always indicated. In 107 cases of exophthalmic goiter there were 6 operative deaths. Plummer's preparation, anesthesia induced with avertin and nitrous oxide or local anesthesia, and unilateral resection were used. Sixty three per cent of the patients treated for exophthalmic goiter were found entirely well and the remainder showed more or less improvement.

Horsley reported 183 consecutive thyroid operations with no deaths. Multiple operations were not performed. Anesthesia was induced with avertin and ethylene. There was no injury to the recurrent laryngeal nerves in any of the cases. Postoperative parathyroid tetany developed in 1 case. The operative site was always drained. All toxic patients were given dextrose in Ringer's solution intravenously during and after the operation, as a rule continuously for the first twenty four to forty eight hours.

Nieden reported satisfactory use of the high frequency coagulation technique in a small series of cases of exophthalmic goiter.

Klose commented on the occurrence of goiter in Danzig, where it has long been known to be

endemic. Its endemic character in that city is remarkable as the fish diet and environment are rich in iodine. The goiter does not occur in the newborn, but develops at puberty, especially in girls. It is of a diffuse colloid type and has a tendency to change to the exophthalmic type. The mortality of the 455 thyroidectomies reviewed by Klose was 2.5 per cent. Malignancy of the thyroid was present in 2.4 per cent of the cases.

Cutler discussed the general principles in the preoperative and postoperative treatment of the patient with a toxic thyroid condition. He agrees with Bauer that hyperthyroidism, 'formes frustes,' may exist without elevation of the metabolic rate. He emphasized that the metabolic rate test, particularly a single determination, should not be relied upon in diagnosis. "As a whole, one may group the toxic thyroid patients into those patients who have the classical disease, exophthalmic goiter, and those patients who have lumpy thyroid glands and show toxic symptoms, commonly called toxic adenomata, to presume that dysthyroidism existed was to run counter to all known physiological data, we know of no conditions in which a gland secretes anything but its normal product, the secretion may be increased or decreased, but it is never changed." Lugol's solution is administered to patients of both types, but in Graves' disease it takes from twenty to twenty five days to produce the maximum decrease in the symptoms whereas in toxic adenomata this decrease is obtained in from ten to fifteen days. For patients who have been receiving iodine for an indefinite length of time before coming to the surgeon, Cutler advises discontinuance of the iodine treatment and a fresh start after a new base line has been established.

Frazier and Johnson summarized the effects of thyroidectomy on hyperthyroidism in 965 cases of thyroid disease in which the operation was performed in the period from 1927 to 1932 at the hospital of the University of Pennsylvania. The response to iodine was the same in diffuse and nodular toxic goiter. Of 467 patients operated upon for diffuse toxic goiter, 363 were considered well, 44 had normal metabolic rates but persistent symptoms, 11 had permanent partially disabling visceral damage, chiefly cardiac, 2 required small doses of thyroid extract, 31 had residual toxicity after the operation and 16 developed toxicity postoperatively. Of the 47 with postoperative toxicity, the condition was controlled by iodine in 16, by roentgen irradiation in 11, and by reoperation in 7. Nine were not cooperative, 3 were still toxic under iodine and roentgen ray treatment, and 1 was still toxic after roentgen ray

treatment and re-operation. Of the total number of patients treated for diffuse toxic goiter, 10 per cent had residual or recurrent hyperthyroidism which was controlled by the procedures mentioned. Of 163 patients who were operated upon for nodular toxic goiter, 141 were well, 15 had residual symptoms, 4 had residual visceral drin age, 2 were by pothyroid, none had residual toxicity, and 1 had recurrent toxicity.

A report on the surgical treatment of Basedow's disease by Heim may be abstracted as follows. Moderately severe and severe cases of Basedow's disease belong unconditionally under the management of the surgeon. A division of the treatment of this condition into an internal (pre-operative) and a surgical (operative) treatment will be recognized as absurd. The surgeon should undertake also the pre-operative management. In mild cases, complete bed rest, the prohibition of visitors, a private room, the use of an ice collar, the application of an ice-bag to the heart, and a lactovegetarian diet, as recommended by Blum, are often enough. In more severe cases the pre-operative management of Plummer is indispensable. Of 50 patients, only 1 died—a woman who was hurried to operation without pre-operative iodine. The formula of the Lugol's solution used at the Martin Luther Hospital is as follows: tincture of iodine, 5; potassium iodide, 10; Aq. dest. ad 100. This solution is stronger than the German solution and weaker than the American solution. Beginning with 5 drops 3 times a day, the dosage is increased to 15 drops 3 times a day. If cardiovascular symptoms are prominent, quinine hydrobromide is given. Even the severest cardiovascular disorder is not a contra-indication to operation. The therapeutic effect of quinidine and the other drugs appears after a few days of iodine treatment. The metabolism can be determined with complete clinical satisfaction from Read's formula ($75 \times \text{pulse rate} + \text{pulse pressure} \times 74 - 72$). The absolute height of the metabolism is not as significant as its depression under treatment. Electrocardiography is not well established in Basedow's disease, the reports of its results showing many variations. In half of the cases the blood picture is that of lymphocytosis and leucopenia. In the other half it is normal or shows a leucocytosis. In the cases reviewed, the return of polymorphonuclears claimed by Kocher was not observed. Of 45 women, the menses were normal in only 9.

Iodine medication without succeeding operation is unconditionally to be avoided. X-ray treatment should be refused not only because of its questionable value but also because it increases

the difficulty of operation by producing sclerosis of the tissues of the neck. In the reviewed cases full narcosis with an avertin base was used. As recommended by Rahm, 0.125 gm. of avertin was given per kilogram of body weight. Intravenous narcosis induced with evipran and eunarcon was found satisfactory. The operative field was prepared with alcohol. In the operative technique the deep supraclavicular collar incision was used to facilitate separation of the vessels of the upper pole. The vessels of the lower pole were ligated at the junction of the inferior thyroid artery with the carotid. The resection was done by wedge formation until only a date-sized remnant remained. Rubber drains were left in for forty-eight hours. Postoperative shock is due, not to flooding of the blood with thyroid secretion, but to a sudden decrease of the latter. It is the hypothyrotoxic shock described by Bier and Roman. In 1 of the reviewed cases unilateral paralysis of the recurrent laryngeal nerve occurred. Of the 50 patients operated upon, 36 have been able to return to work, 9 are still under treatment, 2 (1 with hemiplegia and 1 with a large myoma) are definitely unable to work, 2 have an unsatisfactory clinical result, and 1 is dead. A convalescent period of from four to six weeks is required to make certain of the operative result.

In an article on thyroid problems and the end-results of operations on the thyroid gland, Dinsmore and Crile called attention to the potential malignancy of all goiters. They stated that of 1,053 goiters removed, malignant tumors were found in 24. Four of the malignant tumors were recurrent. In 9 cases, malignancy was suspected after the operation. The authors concluded that malignancy is present in 1 per cent of all patients coming to thyroidectomy. Therefore early operation is indicated in every case of goiter even if malignancy is not suspected. The operative mortality is 0.25 per cent.

In a discussion of the surgical aspects of thyrotoxicosis, Dunhill stated that, in 1922, the number of deaths from Graves' disease in England and Wales was 653, and in 1930, 1,404. In regard to dogmatic statements of results he said, "It can not be emphasized too much that some patients can not be made safe for surgery, and the sooner the word 'cure' is dropped in this disease the better." The most common complications are auricular fibrillation and congestive failure. Next most common is glycosuria. Mental derangement may be severe, and emaciation extreme. Localized myxedema and generalized pruritis may occur. Operation should not be hurried. The results of operation are excellent. In recurrences, x-ray

irradiation or a second operation may be required. In the cases of children, only the partial thyroidectomy should be done. X-ray treatment also may be used. As regards x-ray treatment in general, Dunhill stated that 140 of his patients eventually came to operation after x-ray irradiation given under favorable conditions.

X-ray treatment of hyperthyroidism continues to have its adherents. Perry reported a small but well controlled group of cases treated with a uniform technique. Two or three months were usually sufficient to obtain the maximum effect. Seventeen of the patients had had previous unsuccessful thyroidectomies. Of these, 13 were clinically freed of symptoms, 1 was greatly benefited, and 3 were not benefited by the x-ray therapy. Eleven patients had had no other treatment before the irradiation. Of these 4 were free from symptoms at the last examination, 3 showed improvement, and 4 showed no improvement. Of both groups combined, 76 per cent were cured, 16 per cent were benefited, and 18 per cent were not benefited.

Cathcart reported that in his series of 84 cases treated by irradiation the average basal metabolic rate was +3.1 per cent before the treatment and -1.2 per cent four weeks after the treatment. An average of 17 treatments per patient was given.

Quincy reported 75 cases of hyperthyroidism treated by x-ray irradiation. Of the cases in which the treatment was completed, recovery resulted in 89.7 per cent, improvement in 8.1 per cent, and no improvement in 2.4 per cent. Fourteen patients discontinued the treatment, 9 could not be traced after the treatment, and 1 died while under observation.

A short monograph on x-ray treatment was published by Guelow. In the 141 cases upon which it was based, medical treatment was combined with the roentgen therapy.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

EYE

Wescott V. Concerning Accommodative Asthenopia Following Head Injury. *Am J Ophth* 1936 19 385

Many patients who have sustained severe head injury complain of annoyance and fatigue in reading. Of a series of seventy-two who had sustained a concussion or skull fracture 65 per cent were found to have accommodative power within the normal limits for their age as defined by Duane. Five had been examined before the injury. Of these two had subnormal accommodation and three had normal accommodation before and after the accident. Two patients who are not included in the series of seventy-two showed unequal accommodation in the two eyes following a severe head injury. The degree of accommodation in the eye with the greater accommodation was within normal limits in nine and below normal in two and the degree of accommodation in the eye with the lesser accommodation was within normal limits in two and below normal in seven.

The author concludes that the ability to read is seldom lost following severe head injury. This was evidenced by the fact that in 65 per cent of the reviewed cases accommodative power was within the normal limits. However the organization of the function of reading was impaired and the difficulty of which the patients complain cannot be explained alone by poor vision, accommodative insufficiency or muscle imbalance.

Gordon B. L. The Problem of the Crystalline Lens. *Arch Ophth* 1930 15 839

The author discusses the rôle of the lens in the production of astigmatism, citing various opinions expressed in the literature. He believes that corneal astigmatism is partly or fully neutralized by the action of the lens. Through the action of the ciliary muscle the lens may become uneven in shape or tilted to enable it to overcome the corneal curvature. The amount of astigmatism may be increased by weakness or paralysis of the ciliary muscle. Asthenopic symptoms may be caused by the effort of the ciliary muscle to overcome corneal astigmatism. By this mechanism patients with corneal astigmatism may obtain normal vision but experience fatigue.

There is no fixed rule for the location of the axis or meridian of the astigmatism. A change in the meridian follows alteration of the lens due to accidents or age. In cases of hyperopic astigmatism the axis tends to rotate from the vertical to the

horizontal meridian with age. In myopic astigmatism the reverse is true. In eyes with a high degree of astigmatism the tendency is toward the vertical meridian when the degree of astigmatism is low it is toward the horizontal meridian. The meridian may be changed also by metabolic disturbances and occupational habits.

An important function of the lens is the correction of errors of refraction existing elsewhere in the eye.

WILLIAM A. MANN, JR., M.D.

Pfeiffer R. L. Roentgenographic Diagnosis of Retinoblastoma. *Arch Ophth* 1936 13 811

Pfeiffer states that the roentgen ray may be used as an aid in the diagnosis of retinoblastoma as he has frequently found it to reveal areas of calcareous degeneration. The presence of calcium was demonstrated in 75 per cent of twenty laboratory specimens even though the roentgen examination did not include the entire globe.

Of fourteen cases with a probable diagnosis of retinoblastoma the presence of such a tumor was proved histologically in ten. Of the latter eight showed shadows of calcium in the orbit prior to enucleation. The two others were in the beginning stage. In four cases of pseudoglioma no calcium was shown in the roentgenograms. Differentiation must be made between the shadows of the psammoma bodies in retinoblastoma and those of heteroplastic bone in the choroid and other calcium deposits in the eye. This is facilitated by the age of the patient and the presence of atrophy.

On the basis of his studies the author concludes that there is sufficient calcareous degeneration in retinoblastoma to be recognized roentgenologically in 75 per cent of cases and that such granular and irregular shadows are pathognomonic when found in children.

WILLIAM A. MANN, JR., M.D.

MOUTH

Rosenthal W. The Pathology and Treatment of Clefts of the Fetal Face and Palate (Anatomie und Therapie der fetalen Gesichts- und Kieferspalten). *Deutsche Zahnärztl. Zeitsch* 1935 2 513

Rosenthal believes that heredity was a factor in 50 per cent of his cases of clefts of the fetal face and jaw. The incidence of such defects was the same in both sexes. Rosenthal advises against sterilization as the deformities are not the result of a generalized germ injury but are local malformations comparable to familial exostoses and familial hernias.

After considering malformations of other parts of the body, constitutional disturbances (digestive disturbances), and deformity and abnormalities of occlusion of the jaws, the author discusses the time for operation. He usually performs harelip operations at the end of the first or second month. Contra indications are dermatoses, furunculosis, infection of the umbilicus, and congenital lues. The optimum time for plastic operations on the palate (the author uses Veau's method) is at the end of the second year, as at this age it is still possible to prevent faulty phonation. Rosenthal's method is a combination of Veau's operation with backward and upward displacement of the soft palate according to the directions of Ernst, but with the use of the celluloid protective dressing of Spanier instead of the Ernst palate plate.

Rosenthal operates on cleft palate in adults and older children and on all harelips under local anesthesia. In the cases of small children he operates for cleft palate under ether anesthesia.

In the after care, speech instruction is of particular importance in addition to protection of the suture by a celluloid dressing. It is just as important as physiotherapy in the treatment of fractures of the extremities.

The mortality of the author's procedure is nil. Veau's mortality of 3.8 per cent the author attributes to the chloroform anesthesia used. Rosenthal's results are excellent. Of 169 cases in which operation was performed according to the method of Veau plus upward displacement, smooth healing occurred in 158 (93.5 per cent). Complete separation of the suture line occurred in only 2, and holes in the palate due to faulty healing in 9. Normal speech was obtained in 47 (27.8 per cent) and marked improvement of speech in 45 per cent. Other good results were obtained by the Schoenborn-Rosenthal operation which was performed chiefly in cases in which the soft palate was too short or was scarred as the result of a previous operation performed poorly. Smooth healing occurred in 95.7 per cent of such cases and normal speech was obtained in 66.3 per cent (MUNNINGER) (V. BURRELL).

THOMAS W. STEVENSON, JR., M.D.

NECK

Krueckmann, E. *New Studies on Torticollis (Neue Untersuchungen ueber Torticollis) 60. Tag d. deutsch. Ges. f. Chir., Berlin 1936*

In every form of torticollis the position of the eyes is changed to obtain stereoscopic depth perception. In cases in which stereoscopic vision is not obtainable because of poor vision or blindness of one eye, or because of squint, a causal relationship between the position of the eyes and the oblique posture of the head is not necessarily present as monocular vision only rarely exerts a motor influence upon the position of the head. Torticollis is very often the result of shortening of one sternocleidomastoid muscle, the cause and development of which are due to the muscle

itself. Frequently also the contraction is secondary to causes at a distance. For instance, if there is an ophthalmological basis, the chief immediate causative factor is weakness or loss of function of one superior oblique muscle due to paresis or paralysis of the corresponding trochlear nerve. When this is the cause, the torticollis, that is, the permanent contraction of the sternocleidomastoid muscle usually develops secondarily.

In the normal as well as in the paretic or paralytic state the superior oblique muscle may remain unchanged in position in certain eye motions such, for instance, as horizontal adduction. However, it participates in vertical ocular movements. For example, a paralyzed superior oblique muscle is unable to lower the eye in adduction. Therefore the eye is involuntarily elevated and stereoscopic vision is difficult or impossible. Under such conditions good results cannot be obtained by surgery.

To obtain binocular vision when the paralyzed muscle is incapable of executing a rotation the loss of the rotatory component is automatically compensated by inclination of the head toward the involved side. This inclination is brought about by contraction of the sternocleidomastoid muscle of the non paralyzed side. Therefore, the position of the diseased superior oblique muscle may be immediately determined from the inclination of the head. Inclination to the right indicates that a right rotator, the superior oblique of the left eye, is affected, and inclination to the left, that a left rotator, the superior oblique muscle of the right eye, is involved. When the compensatory inclination of the head takes place it is followed immediately by a counter rotation to correct the paralytic separation of the longitudinal mid sections of the eyes and make them parallel. As the paralyzed eye can participate but little in the counter rotation, the sound eye must produce it until the lines of vision are again parallel. If this is achieved by a compensatory inclination of the head, binocular vision is possible.

The article contains photographs showing the changes occurring particularly in cases of hydrocephalus, tower skull, asymmetrical extremities, general asthenia, hyperextensibility, and indolent posture, which are frequently accompanied by torticollis. The discussion of conditions in which torticollis of ocular origin is favorably influenced by spectacles is not reviewed in greater detail in this abstract because these are considered chiefly from the standpoint of ophthalmology rather than surgery. (F. KRUECKMANN) LEON M. ZIMMERMAN, M.D.

De Quervain, F. *Iodine in the Physiology and Pathology of the Thyroid (L'iodine dans la physiologie et la pathologie de la thyroïde) Presse méd., Par., 1930, 41: 649*

Iodine has been associated with the problems of the pathology of the thyroid gland since Straub and Coindet recognized this element as the active therapeutic agent in calcined sponge one hundred and fifteen years ago. Since its discovery in the

normal thyroid gland by Baumann forty years ago, it has dominated also the physiology of the gland.

The normal thyroid contains from 7 to 10 mgm of iodine. The amount varies with age, sex, and various pathological conditions (Aeschbacher 1905). It occurs in three forms: (1) iodine soluble in water alcohol and acetone partially inorganic and ionized; (2) organic iodine soluble in water insoluble in alcohol and acetone and combined with proteins or their derivative, thyronin and diiodotyrosine; and (3) iodine insoluble in water alcohol and acetone which is attached to the walls of the cells. These three forms are present in the proportions 20:55:25. The most uncertain is the value of the inorganic portion. The iodine is obtained from the food, water and air and is absorbed into the blood. Among the first to demonstrate it in the blood was Gley. The daily intake is on the average from 70 to 100 millionths of a gram which is one hundredth of the iodine reserve of the thyroid and one tenth of the quantity of iodine circulating in the blood. As the quantity in the blood remains constant within certain limits it is possible to speak of an 'iodine threshold' of the blood. Excess iodine is eliminated by way of the kidneys, skin, lungs and intestines.

The biologically active fractions of the iodine of the thyroid are diiodotyrosine and thyronin. The former is not an exclusive product of the thyroid. It is found also, among other substances in coral and sponges. In man it contains about one half of the thyroid iodine. It is without action on the metabolism, the nervous system or the circulatory system but weakens the action of the thyrotropic hormone of the hypophysis.

Thyronin is the product of the combination of diiodotyrosine with diiodohydroquinone. It contains a seventh of the thyroid iodine. The importance of the organic part of the molecule of thyronin is evident from the fact that when thyroid tissue is treated with pepsin a substance twice as active as thyronin with an equal content of iodine—a superthyronin—is obtained. The question is to whether or not thyronin acts on the tissues as such is answered negatively. If it is produced by tissues other than the thyroid the quantities are too small to be detected. If the essential function of the thyroid is the production of several organic combinations of iodine the venous blood from the thyroid should differ from the arterial blood. This theory has been proved correct by biological studies.

Calcined sponge has been used as a remedy for ordinary endemic goiter at least since the Middle Ages but its effect was not explained until iodine was discovered by Courtois in 1817 and was demonstrated to be the active agent in sponge by Straub and Coindet in 1819. In the beginning of the therapeutic use of iodine it was found that minute doses are as effective as massive doses. This fact is recognized today but was forgotten for a time. When the treatment is stopped the goiter very frequently recurs.

The goiter which can be benefited by iodine therapy are those of the diffuse and nodular colloid type and those of the parenchymatous (diffuse hyperplastic) type. Effects on the ordinary colloid goiter are best obtained before puberty.

The protective effect of iodized salt against endemic goiter was first recognized in Bousisingault in 1838. On the basis of this observation Chatin studied the iodine content of the water, soil, food and air in various regions of France, established a parallelism between iodine deficiency and a high incidence of goiter and determined the normal daily requirement of iodine by man. His studies were followed by an attempt to prevent goiter by adding iodides to the alimentary salt. This attempt was soon abandoned because of political disorganization and occasional toxic accidents but was renewed following the work of Marine. In Berne the weekly administration of 3 mgm of iodine reduced the incidence of adolescent goiter from 94 to 17 per cent.

Whether or not the prophylactic use of iodine is truly eiotropic remains a question. However, so far as adolescent goiter is concerned its efficacy is well established. In the cases of adults the occasional occurrence of toxic symptoms was recognized when the treatment was first attempted in 1830. Hence it became necessary to determine the smallest daily dose that would be active and at the same time non toxic. Eventually this was found to be 0.5 mgm (Flueck 1923). In Switzerland sufficient iodine is added to the alimentary salt to meet one half of the normal daily requirement.

The clinical picture of goiter rendered toxic by iodine was recognized to be that of exophthalmic goiter (Rilhet) without, or almost without, the exophthalmos a phenomenon that is still unrecognized.

In contrast to this is the favorable influence of iodine on true Basedow's disease which was well known to Trouseau and later restudied by Waller, Neisser and Plummer. Today the administration of iodine is an essential part of the pre-operative treatment. There remains however a difference of opinion regarding the effectiveness of iodine in toxic adenoma. The mechanism of action of iodine in these two conditions is apparently related to the regulation of the metabolism of iodine in the thyroid gland. The center of regulation is now believed to be the hypophysis.

Substances antagonistic to the products of the thyroid gland are attracting most attention at the present time. Their existence has been suspected for forty years. In 1923 Hara and Branovsky demonstrated a biological antagonism between the blood in cretinism and Basedow's disease. In 1932 Saegesser an antagonism between cholesterol and thyronin, and in 1933 Abelin a partial antagonism between thyronin and diiodotyrosine. Other antagonistic substances are being described.

The prophylaxis of goiter (Marine, Lenhart and Kimball) is now based upon the theory that a certain minimum quantity of iodine is essential for

normal function of the thyroid, that a deficiency is met by a compensatory hyperplasia, and that the hyperplasia is the origin of all forms of endemic goiter. However, although iodine is the most effective protective substance, the work of MacCarrison on other deficiency states shows that a deficiency of iodine is not the only factor in goiter and thereby supports the old theory of Saint Lager that the causes of goiter are multiple.

Passing from protection of the thyroid against goiter to restitution to normal of a gland that has become pathological, we come to less solid ground. Numerous problems will remain until new methods have clarified the physiological and pathological chemistry of the thyroid.

ALBERT F. DEGROAT, M.D.

Maher, C. C., and Sittler, W. W. The Cardiovascular State in Thyrotoxicosis. *J. Am. M. Ass.*, 1936, 105: 1546.

Maher and Sittler review 180 cases of thyrotoxicosis with regard to the cardiovascular state. They classify them into 3 groups: (1) those of thyrotoxicosis without structural heart disease (20.6 per cent), (2) those of thyrotoxicosis with organic heart disease (75.5 per cent), and those of neurocirculatory asthenia with possible thyrotoxicosis (3.8 per cent). The group with organic heart disease they classify into subgroups from the standpoint of etiology.

Thyrotoxicosis uncomplicated by organic heart disease. Of the 37 patients with this condition 12 had an exophthalmic goiter and 25 an adenomatous goiter. These patients ranged in age from twenty-four to sixty-two years, but the majority were under twenty-five. Their chief symptoms were palpitation and tachycardia. Twenty-five per cent suffered from dyspnea. None had congestive failure or anginal pain. Murmurs were heard in only 12 per cent of the cases and in all of these were functional. The systolic blood pressure ranged from 115 to 148, and the diastolic from 58 to 85. The ortho diagrams were normal. The electrocardiograms were within the normal range except for minor arrhythmias. In 1 case there was auricular fibrillation.

Structural heart disease with hypertension. Of the 55 cases of this condition 41 were those of women. The patients ranged in age from twenty-seven to seventy-two years, but 80 per cent were between forty and sixty-five years. Nine had an exophthalmic goiter and 46 an adenoma. Thirty-two presented some sign of congestive failure. Two had a cerebral vascular disorder, and 2 were uremic. Seventeen had no symptoms except palpitation and tachycardia. The systolic blood pressure ranged from 160 to 170, and the diastolic from 90 to 150. All of the patients had more or less peripheral arteriosclerosis. Systolic murmurs and accentuated second aortic sounds were generally present. A gallop rhythm was found in 10 per cent of the cases. In 41 cases the electrocardiogram showed a left axis deviation, and in 12 a normal axis. In 70 per cent

there were deformities of the ventricular complex. Thirteen patients had auricular fibrillation, 2, a left bundle branch block, 1, a persistent auricular flutter, and 1, a paroxysmal tachycardia. Ortho diagrams showed enlargement of the left ventricle in all of the cases and widening of the aortic shadow in more than half of them. Six patients had a cerebral thrombosis within two years after thyroidectomy.

Rheumatic heart disease. This condition was present in 42 (23.3 per cent) of the cases. Twenty-nine of the patients were women. The ages ranged from twenty to sixty-five years, but 75 per cent of the patients were under forty-five years. Thirty-six had an adenomatous goiter and 6 an exophthalmic goiter. A history of rheumatism was given by 60 per cent. Forty per cent had congestive heart failure, 1, a dry pericarditis, and 7, active rheumatic fever. Thirty-four had mitral stenosis. Roentgen studies showed the characteristic changes of the particular valvular lesion. Electrocardiograms disclosed auricular fibrillation in 42 cases, heart block in 4, and complete auriculoventricular block in 2.

Arteriosclerosis. Twenty patients, of whom 12 were women, had arteriosclerosis. All but 1 were under seventy years of age. Nineteen had an adenoma, and 1 an exophthalmic goiter. All suffered from angina. Eight had congestive failure in addition. All had marked peripheral sclerosis and half of them a moderate hypertension. The electrocardiograms showed auricular fibrillation in 6 and a permanent, complete auriculoventricular dissociation in 1. Three patients died of coronary thrombosis, and 1 of cerebral thrombosis.

Pulmonary heart disease. Nine men and 2 women ranging in age from forty-one to sixty-seven years suffered from pulmonary heart disease. Only 2 were operated upon. Nine had symptoms of congestive heart failure, 2, asthma, 1, a syphilitic lung disease, and the remainder, bronchiectasis.

Syphilitic heart disease. Seven patients, 5 of whom were women, had syphilitic heart disease. They ranged in age from twenty to fifty-five years. Six had an adenoma and 1 an exophthalmic goiter. Two were operated upon. One patient had syphilitic aortic insufficiency, 5, systolic murmurs, and 1, an associated syphilis of the central nervous system. One had a paroxysmal auricular fibrillation.

Neurocirculatory asthenia. This condition occurred in 5 women and 2 men ranging in age from twenty-two to forty years. These patients presented the usual symptoms of fatigue, palpitation, weakness, and lowered resistance. All had tachycardia, but otherwise the findings of physical examination were essentially negative. Electrocardiograms and roentgen studies were also negative. The basal metabolic readings were inaccurate. No patient derived benefit from operation.

The authors conclude that while thyrotoxicosis probably does not *per se* cause heart disease, it may accelerate the development of an existing cardiac lesion.

FRED S. MODFERN, M.D.

Portmann U V Diseases of the Thyroid Gland and Their Response to Roentgen and Radium Therapy *Med Clin North Am* 1936 19 1765

This article is a general discussion of the effect of roentgen and radium therapy upon diseases of the thyroid gland. No material is cited. Portmann states that irradiation has no effect on non-toxic goiter but that in his opinion its results in toxic goiter compare quite favorably with those of surgery. He describes the technique briefly. He advises irradiation for various forms of thyroiditis. He states that 90 per cent of all malignant lesions of the thyroid originate in adenomas and that most malignant adenomas are sensitive to irradiation. He briefly describes the technique for irradiation of thyroid malignancy. PAUL STARR M.D.

Nasta T Treatment of Cicatricial Stenoses of the Larynx by Laryngotomy and Myohyoid Autoplasty (Traitement des stenoses cicatricielles du larynx par laryngotomie et autoplastie myohyoidienne) *Bull Acad de med de Roumaine* 1936 1 21

Nasta describes a one-stage operation for the treatment of cicatricial stenosis of the larynx which he has performed since 1916. It consists of the following four steps:

- 1 Incision of the skin and soft tissues and preliminary tracheotomy.
- 2 The formation of osteomuscular (myohyoid) flaps, laryngotomy, and removal of the endolaryngeal cicatricial tissue.
- 3 The introduction into the larynx of a tube around which a new laryngeal canal is to be formed.
- 4 Fixation of the osteomuscular flaps between the two halves of the thyroid and cricoid cartilage and closure of the wound.

The osteomuscular flaps are formed by dividing the hyoid bone in its median and lower portions with the muscles which have their site of insertion in this portion of the bone. The flaps are covered with compresses and drawn to each side. The laryngotomy and removal of cicatricial tissue are then done. The cicatricial tissue is removed with an electric knife. A rigid rubber tube varying in size according to the age of the patient is fixed in the larynx above the tracheotomy tube, and attached to the latter by a silk suture. The myohyoid flaps

are then placed according to the site of the stenosis. If the stenosis was in the region of the thyroid cartilage, one flap is placed between the two halves of this cartilage and the other above it. If the stenosis was in the region of the cricoid cartilage, one of the flaps is placed in the region of the thyroid cartilage and the other between the two halves of the cricoid cartilage. These transplants are sutured with catgut to the perichondrium and the neighboring tissues. The wound is then closed with a small drain in the lower angle.

The rubber tube used in this operation destroys by pressure whatever cicatricial tissue is not removed and helps to mold the newly formed laryngeal canal. Even if some new cicatricial tissue forms, a sufficiently large laryngeal canal is obtained by the use of the hyoid bone transplants. The presence of the tube is well tolerated after a few days; the patient is not conscious of it. The wound usually heals in from ten to twenty days. The tube is removed after forty to fifty days before the tracheotomy tube is removed, by cutting the silk suture by which it is attached to the latter. If the patient breathes well after the removal of the tracheotomy tube the operation is completed. If the larynx is not completely healed and respiration is not normal, a slightly larger laryngeal tube is introduced through the tracheotomy opening and attached to the tracheotomy tube, which is replaced. After another twenty to thirty days complete cure is obtained, the tubes are removed and the tracheotomy wound closes in a few days.

The author has treated seven cases of severe stenosis of the larynx by this method. The results were excellent in all but one case, in which the stenosis was situated so low that the tracheotomy opening was made in part of the cicatricial tissue. If a lower tracheotomy opening had been made so that the cicatricial tissue could have been more thoroughly removed, the results would probably have been as satisfactory as those obtained in the six other cases.

The author has found that the described method is simple, gives good results, and requires a much shorter time than other methods. He believes it can be employed also in cases of recurrent nerve paralysis to enlarge the laryngeal canal and insure normal respiration. ALICE M. MEYERS

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS, CRANIAL NERVES

Davis, L., and Droege Mueller, W. The Surgical Treatment of Epileptiform Seizures *Ann Surg.*, 1936, 103 669

The underlying nervous physiology of epilepsy is obscure. Epilepsy is not a disease, but a clinical entity which is the result of a sudden violent discharge of neural elements produced by a noxious stimulus. The so called "idiopathic" or "true" epilepsy has as its only symptom convulsive seizures. For this type no anatomical substratum has been discovered. Among diseases with convulsive seizures as a part of their syndrome are intracranial tumors, abscesses, arachnoiditis, cerebral arterio sclerosis, and intoxications. It is with the pathological conditions accompanied by epileptiform seizures that surgical therapy is concerned.

Since the discovery by Fritsch and Hitzig of the electrical irritability of the brain, 3 chief theories have been advanced concerning the convulsive site: (1) that it is in the cortex alone, (2) that it is in both the cortex and the subcortex, and (3) that it is in the medulla. From their own studies and from reports of experimental work the authors draw the conclusion that whatever element of the seizure may be lacking in a convulsion produced in an animal with a mutilated brain, convulsions (tonic, clonic, or both) may be produced from the cortex and from the subcortical region. Convulsions can be produced from the subcortical region in the absence of the motor cortex. The symptoms of the convulsions produced vary with the state of preservation of the brain. In a cortical fit the tonic element is absent, loss of consciousness does not occur until a generalized convulsion ensues, and involuntary urination does not occur before the loss of consciousness.

The authors state that their experience with surgical procedures in convulsive states has been obtained from 2 types of cases: (1) those in which there were intracranial tumors or abscesses, and (2) those in which the seizures were supposedly the result of trauma to the brain. In the review of their material only verified cases were included. They state that the extent of involvement is not always grossly visible as involvement of adjacent portions of the brain may occur secondarily and confuse the interpretation. Many of the minor symptoms are of more localizing and diagnostic value than major seizures.

A surprisingly large number of patients with intracranial tumors have convulsions, and in many the convulsion is the initial symptom. It was not long ago that the meningiomas were considered to

be the intracranial tumors most often associated with convulsions. In the authors' experience, 62 per cent of the patients with glioblastomas, 72 per cent of those with astrocytomas, 39 per cent of those with meningiomas, and all but 1 of those with angiomas had epileptiform seizures. Four of thirty-six patients with pituitary tumors had convulsions, but in each of these the tumor had grown outside of the boundaries of the sella turcica. Of the patients with metastatic intracranial tumors, 37 per cent had convulsive seizures. A large percentage of each of the first 4 groups had a history of convulsions extending over a period of from one to six years. In any series of cases of intracranial tumor the majority of the patients are adults. It is therefore important to emphasize that when convulsions occur in an adult an intracranial tumor should be immediately suspected. It should be emphasized also that choked disk is a late sign in a large number of cases of intracranial tumor.

Intracranial abscesses are likewise frequently associated with epileptic manifestations, but in the authors' cases the period of time during which the seizures were present was definitely shorter than in the cases of tumor.

It was found that seizures occurred in patients with tumors in the cortex, subcortex, pons, mid brain, third ventricle, and posterior fossa. The only tumors occurring in the posterior fossa which were not accompanied by convulsive seizures were the acoustic neuromas. Analysis of the objective and subjective phenomena in an attempt to correlate epileptic manifestations with definite functional areas of the brain allows very few definite conclusions. Localized muscular twitchings occurred by far most often with tumors situated in the parietal lobe. Vasomotor phenomena, such as pallor, drooling, cyanosis, flushing, and lachrymation occurred with tumors in the frontal lobe. Loss of consciousness occurred just as often with tumors of one lobe as with those of another, thus opposing the theory that arrest of consciousness occurs when the frontal lobe alone is discharging.

The subjective symptom of a bad odor or taste occurred exclusively in cases of tumor of the temporal lobe, particularly those of tumor of the uncinate gyrus. All patients who had a visual aura had a tumor of the occipital lobe except those whose aura involved objects rather than light or color. The latter had a tumor of the temporal lobe. Temporary complete blindness may occur during the discharge of the occipital lobe produced by a tumor.

Penfield has reported the occurrence of "autonomic epilepsy" in a case of tumor of the third ventricle. This indicates that a convulsive discharge may occur from centers as high as the anterior por-

injuries in the form of eye muscle paralysis and clouding of the cornea have occurred. It seems that such complications can now be avoided by proper changes in the technique.

In every case in which the localizing apparatus was used, the foramen ovale and the gasserian ganglion were reached without difficulty. In about one fourth of the patients who were under observation longer than two years recurrences developed but these were easily overcome by renewed coagulation. After a period of two years recurrences no longer seem to take place. The results obtained in more than 230 cases were satisfying to the highest degree. Some of the patients had suffered excruciating pain for years had gone from one specialist to another in vain and had been operated upon a number of times. Some of them had been unable to speak for years and were hardly able to eat. In only about 10 per cent of the cases was it impossible to abolish the pain completely. In these the causative factor was apparently situated in the center of the gasserian ganglion. The Dandy operation also fails to relieve the pain in such cases.

The author presents a roentgenogram showing supramandibular and inframandibular coagulation in the case of a patient with very severe attacks of trigeminal neuralgia who was well the day after the coagulation.

HARRY A. SALZMANN, M.D.

Tremble G. E. and Penfield W. Operative Exposure of the Facial Canal with Removal of a Tumor of the Greater Superficial Petrosal Nerve. *Arch Otolaryngol* 1936 23 573

The authors report a case of perineural fibroblastoma of the greater superficial petrosal nerve which was discovered at the time of operative exposure of the facial canal. They believe that this is the first case to be recorded in the literature.

After reviewing a series of tests to localize the lesion in the facial nerve they describe the technique of exploring the facial canal through an incision similar to that for radical mastoidectomy. They believe that in cases of paralysis of the facial nerve this procedure should be followed more frequently, either for the relief of pressure on the facial nerve, direct suture or if the operative findings indicate, facial hypoglossal anastomosis.

ROBERT ZOLLINGER, M.D.

McKenzie K. G. Intracranial Division of the Vestibular Portion of the Auditory Nerve for Ménière's Disease. *Canadian M Ass J*, 1936 34 369

The author reports twelve cases in which unilateral section of the vestibular portion of the auditory nerve was done for the relief of intractable vertigo and tinnitus.

The vestibular and cochlear fibers forming the auditory nerve approach the brain stem together from the internal auditory meatus. When the body is in the prone position, the vestibular portion forms the cephalad and dorsal half of the nerve in the region of the meatus. More medially, the vestibular fibers become ventral. On microscopic examination the vestibular nerve shows a better defined picture of medullated nerve fibers and the fibers are found to be thicker and to have a thicker medullary sheath. These differences can be recognized also on gross section as the nerve is cut in the region close to the internal auditory meatus. Because of the intermingling of a small number of adjacent cochlear and vestibular fibers as the two portions of the nerve lie side by side it is impossible to split the nerve in the microscopic sense. For clinical purposes however, the division is sufficiently accurate.

Exposure is obtained through a unilateral cerebellar approach as high and as far lateral as the position of the lateral sinus and mastoid cells permits. With a straight knife a short incision is made into the center of the nerve parallel with the fibers and close to the internal auditory meatus. This divides the nerve approximately into its vestibular and cochlear portions. The vestibular portion is then isolated by passing a blunt right angled hook over the cephalad and dorsal half of the nerve and is sectioned.

Of the twelve patients subjected to this operation eleven recovered. For a few weeks or months after the operation there is apt to be a moderate degree of unsteadiness in walking or standing. Of nine cases analyzed from the standpoint of the effect of the operation upon tinnitus the tinnitus ceased completely in two was markedly decreased in five and remained unchanged in two. In all except two cases caloric response was absent following the operation. Seven of the twelve patients had such poor bearing on the affected side that it was of little importance to save the cochlear fibers. However the hearing which they retained was not impaired by the operation. The remaining five patients had useful hearing but unfortunately two failures occurred in this group. One patient with an unsuccessful result died of a wound infection eleven days after the operation. In the case of the other the cochlear fibers were cut unintentionally.

On the basis of his experience the author concludes that it is possible to section the vestibular portion of the auditory nerve without interfering with the function of the cochlear fibers. This procedure will cure patients who are suffering from severe and disabling attacks of vertigo. However it should be reserved for selected cases which do not respond to other therapeutic measures.

ARTHUR S. W. TOUROFF, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Gajzag, E. von Roentgen Therapy of Mastitis
(Die Roentgentherapie der Brustdrüsenentzündung) *Strahlentherapie*, 1935, 54 639

The author reports his results from weak roentgen irradiation in 100 cases of mastitis. In an irradiation field measuring from 8 by 10 to 15 by 15 cm., from 50 to 150 r were given according to the depth of the affected tissue, with a skin focus distance of 30 cm. 190 kv., 5 ma., and filtration with 0.5 mm. of zinc plus 0.5 mm. of aluminum.

With regard to the mechanism of action of the irradiation, the most probable explanation is that of Vogt who claims that there is a local as well as a general effect. The local effect consists chiefly of an effect on the tissue cells and improvement of the blood supply by active hyperemia. According to healing, the cases may be divided into 3 groups: (1) those with prompt cessation of pain, rapid improvement in the general condition, reduction of the temperature within twenty-four hours, and cure within twenty-four hours; (2) those with aggravation of the febrile reaction immediately after the irradiation, subsidence of the temperature and disappearance of the other symptoms on the following day, and cure within two days; and (3) those with gradual decline of the temperature and definite cure within a week, possibly after repetition of the irradiation. Incision was necessitated by a subsequent abscess in only 9 of the 100 cases.

The author does not state whether the previous irradiation hastens regression of the inflammation and improves the healing tendency. However, he says that early irradiation is of great importance since roentgen treatment on the first day of the illness is followed by cure in 95 per cent of the cases and roentgen treatment on the second day is followed by cure in 90 per cent, whereas when the irradiation is first carried out later its results are not satisfactory.

(KARL KOCH) JACOB I. KLEIN, M.D.

Picco, A. The Influence of Castration on the Development of Fibro-Adenoma of the Breast in the Rat (Influenza della castrazione sullo sviluppo del fibro adenoma mammario del ratto) *Tumori* 1936, 22 231

The author performed his experiments on both male and female rats. He found that, in the males, transplants of fibro adenoma took and grew in the breast whether the animal was castrated before the transplantation or after the fibro adenoma had undergone moderate development.

In the female rats the transplants never took, but if an animal already had a growing fibro adenoma of

the breast castration did not prevent the full development of the tumor.

From these findings Picco concludes that the ovarian endocrine substances are essential for the development of fibro adenomatous growths in the female breast and are very important factors predisposing to the formation of such tumors.

CARLOS S. SCUDERI, M.D.

Graham, A. Cancer of the Breast *Pennsylvania M J*, 1936, 39 561

This article is based on 458 cases of carcinoma of the breast treated in the period from 1895 up to and including 1930. The author has previously reported the general end results in these cases. He now subjects them to a very detailed statistical analysis which does not lend itself very well to a brief summarization.

He divides the cases into 4 groups according to the extent of the lesions and discusses especially the results of operation alone and operation plus irradiation in each group. From the clinical end results in the different groups in successive five year periods he concludes that patients treated by operation alone apparently get along as well as patients treated by both operation and irradiation. Of 306 patients traced between 1895 and 1928, 58 per cent were treated by irradiation, and in the cases of approximately 90 per cent of these the irradiation was instituted immediately or very soon after operation.

G. DANIEL DELPRAT, M.D.

TRACHEA, LUNGS, AND PLEURA

Magill, I. W. Anesthesia in Thoracic Surgery, with Special Reference to Lobectomy *Proc Roy Soc Med*, Lond., 1936, 29 643

The presence of disease in the organs involved in respiration places many thoracic operations in a special category from the standpoint of anesthesia. The poor general condition of the patient, his position on the operating table, and the necessity for aspiration throughout the course of the operation are all important factors.

On the basis of his experience in anesthetizing 128 patients subjected to lobectomy by the same surgical team, the author states that preliminary medication should be short and active and recovery from the anesthesia should be rapid. For general anesthesia he recommends the administration of omnopon and scopolamine three quarters of an hour before the operation and the intravenous injection of a minimal dose of evipan immediately before induction of the anesthesia.

Spinal anesthesia was used for lobectomy and pneumonectomy in 23 cases. The patients were able

to breathe quite well during the presence of an open pneumothorax, and oxygen was rarely given.

In high abdominal operations the fall in the blood pressure was found to be less marked than when spinal anesthesia was used.

The great danger of alternate bouts of cyanosis and oxygen inflation during general anesthesia in cases of pulmonary disease is emphasized. Cyclopropane is of great value in surgery of the chest. It is favored over nitrous oxide and oxygen unless diathermy is to be employed. In the use of nitrous oxide and oxygen alone there is some degree of suboxygenation. When diathermy is employed chloroform is the only supplement which can be used without the risk of an explosion.

There are 3 alternative methods of intubation. One is the use of an endotracheal tube with a balloon cuff through which suction can be applied. This method is applicable at any age. Another method is the introduction into the main stem bronchus on the sound side of a tube with a balloon cuff to prevent the spilling over of secretions from the contralateral lobe. When such a tube is employed on the right side there is danger of occluding the bronchus of the right upper lobe. This method is particularly suitable for pneumonectomy. The third method consists in the use of an intratracheal tube combined with the insertion into the bronchus on the affected side of a suction catheter bearing a balloon to close off the main bronchus. This method is favored for lobectomy.

In conclusion the author says that the importance of positive pressure for intrathoracic operations has been overemphasized. There is danger in inflating a diseased lung especially when sputum is abundant. The lowest pressure consistent with a smooth anesthesia should be employed.

RICHARD H. OVERHOLT, M.D.

Natolay G. The Treatment of Non Tuberculous Suppurative Pleurisy. (Ueber die Behandlung der nichttuberkulösen eitrigen Brustfellentzündung). *Ortschr.* 1935 57 790.

In the treatment of non tuberculous suppurative pleurisy the First Surgical Clinic of the University of Budapest has given up the open method with rib resection for the closed method with suction. The mortality of the open method reported by all surgeons was extremely high. In 97 cases treated by Redwitz it was 22.6 per cent. Eiselsberg reported it as 33.3 per cent. Koerte as 31 per cent. Schaedel as 44.1 per cent and Hirano as 50 per cent. During the influenza epidemic of the years 1918 and 1919 it rose to 90 per cent.

The author reviews 309 cases which were treated surgically during the period from 1914 to January 1, 1935. Two hundred and six of the patients were males. Fifteen patients were between one and ten years of age, 41 between ten and twenty years, 93 between twenty and thirty years, 64 between thirty and forty years, 41 between forty and fifty years, 30 between fifty and sixty years and 25 between

sixty and sixty nine years. The youngest patient was two and a half years old and the oldest sixty nine years.

Sixty four (20.7 per cent) of the 309 patients died. In the cases of males the mortality was 21.8 per cent, and in those of females, 18.4 per cent. The mortality was highest, 44.4 per cent, during the influenza epidemic of 1919 and 1920. The Clinic then changed to the closed or suction method of treatment. Of 67 patients treated by the latter method only 9 (13.4 per cent) died. Two of those who died were in extremely poor condition when they entered the clinic. One of them died when the suction tube was introduced and the other on the same day that the tube was introduced. In 2 fatal cases autopsy revealed lung abscesses, and in 1 case the presence of a suppurative pericarditis and mediastinitis. In these cases death was due to the severity of the illness rather than the therapeutic procedure.

For a suction tube a Pezzer catheter is used. The openings in the tube are enlarged to keep them from becoming clogged by the fibrin. The catheter is connected with a Perthes Halter suction bottle. The introduction of the catheter may be done through a thoracotomy opening or after rib resection performed according to the method of Perthes. When the thick pus clogs the tube, normal hydrochloric acid pepsin solution is introduced to thin the pus. Several times a day the lung is subjected to positive pressure. Encapsulated empyemas are treated by partial thoracoplasty.

Of the cases reviewed healing occurred without fistula formation in 271 and with fistula formation in 38 (12.3 per cent). Of the 203 cases treated by rib resection healing occurred with fistula formation in 33 (16.3 per cent). The results of the closed method of treatment were better, 25 of the 67 cases in which this procedure was used fistula formation occurred in only 5 (7.5 per cent). In these cases also the duration of the treatment was shorter, as healing usually occurred within from sixteen to twenty three days whereas in the cases treated by the open method it required at least four weeks. In 13 of the 67 cases treated by suction drainage suppuration of the wound made it necessary to change from this treatment to simple open drainage under positive pressure. Complete healing of the fistula resulted in all but 3. Of 44 patients who were subjected to a second operation because of a chest fistula 8 (18.2 per cent) died. In 11 cases dense adhesions of the lung were sectioned by deep incisions. In 8 cases a small secondary minor operation was necessary. In all of the cases in which operation was performed the fistula closed eventually.

In conclusion the author says that there should be no haste to operate for empyema as even relatively large cavities may disappear completely in from three to five months under the influence of suitable lung exercises.

(VON LOBMEYER) LEO A. JCHNEK, M.D.

HEART AND PERICARDIUM

Shipley, A. M. Suppurative Pericarditis. *Ann Surg.*, 1936, 103, 699

The author states that up to January 1, 1934, 227 cases of pyopericardium had been reported. Twelve of them were his. In this article he reports the present condition of six of his seven patients who recovered and discusses the question of adequate drainage.

Although it is widely believed that most patients operated upon for pyopericardium are thereafter seriously crippled by adhesive pericarditis, there is abundant proof that the operation may be followed by no clinical evidences of serious interference with cardiac function. The author collected from the literature 39 cases in which at least one year had elapsed since the pericardiotomy. At the time of the report, 35 of the 39 patients were alive and well, with cardiac boundaries within the normal limits, 1 was alive but had adhesive pericarditis, 1 had died of an unknown condition three years after the pericardiotomy, 1 had died of an abscess of the brain, and 1 had died of adhesive pericarditis.

Of the author's 7 patients who recovered after the operation, 6 have been traced. Five have no clinical evidences of disability. The 1 exception is a seven-year-old boy who had a history of valvular heart disease before the development of the suppurative pericarditis. After the operation this patient developed thrombophlebitis in one leg. In spite of the triple handicap, his circulatory system is functioning very well.

The author describes the 4 anatomical phases of chronic adhesive pericarditis. In the first phase there are adhesions between the inflamed pleura and the outer layer of the parietal pericardium. In the second, a mediastinopericarditis develops. In the third, there is a constricting pericarditis. In the fourth, adhesions occur between the layers of the pericardium. While these adhesions do not cause constriction and the pericardium is not adherent to the chest wall, the pericardial sac is more or less obliterated and it is in this phase that the heart is perhaps most seriously handicapped.

After discussing the reports and observations of others relative to the approach to the pericardium, the author concludes that the lower anterior approach is better than the higher parasternal approach at the level of the fourth and fifth costal cartilages. Two small tubes placed with the fingers behind the heart and fastened to the skin margins will expedite drainage and may be used for irrigation if fluid escapes from the pericardial sac as fast as it is introduced. **HERBERT F. THURSTON, M.D.**

ESOPHAGUS AND MEDIASTINUM

Soils, Cohen, L., and Levine, S. Congenital Atresia of the Esophagus with Tracheobronchial Fistula. *Am. J. Dis. Child.*, 1936, 51, 1119

The authors report a case of congenital atresia of the esophagus with a tracheobronchial fistula that

falls into the third division of Ballantyne's classification.

The patient was a male infant that lived eight days. The delivery was normal. Because of aerophagia, dyspnea, cyanosis, retraction of the intercostal spaces and of the suprasternal notch, the bubbling of mucus, and full and pulsating fontanels, enlargement of the thymus with pressure on the trachea was suspected.

X-ray examination revealed bilateral lobulation of the thymus gland, but as the dyspnea was so marked some other condition was believed to be present. Endoscopic examination demonstrated that the esophagus ended in a blind pouch at the level of the bifurcation of the trachea. Further roentgen study showed the abdomen to be distended because of air in the stomach and small bowel. It disclosed also an airway leading from the bifurcation of the trachea to the stomach. The airway was the diameter of a pencil above and dilated below.

After death, a tracheobronchial fistula was demonstrated by roentgenological study following the injection of barium into the trachea and was found at autopsy.

As new diagnostic criteria of such lesions the authors suggest the demonstration by roentgenograms of absence of air in the upper part of the esophagus due to retained secretions, and of the terminal part of the esophageal airway leading into the stomach from its fistulous connection with the trachea. They state that tracheobronchial fistula should be suspected in the cases of newborn infants who vomit and whose stomach and intestines are filled with air. **EARL O. LATIMER, M.D.**

Negus, V. E. Report on a Specimen of Dilated Esophagus in an Infant Aged Six Weeks, with a Consideration of the Possible Causes of the Condition. *J. Laryngol. & Otol.*, 1936, 51, 100

The infant whose case is reported by Negus was born six weeks prematurely and died at the age of six weeks of inanition due to vomiting. The autopsy findings were negative with the exception of dilatation just above the lower half of the esophagus. Microscopic examination of the esophagus showed no marked departure from normal.

Air swallowing was strongly suggested as the cause of the dilatation. The only factor against this causation was the shortness of the period before the symptoms appeared.

Although no powerful sphincter, at the level of either the diaphragm or the cardia has been demonstrated on esophagoscopic examination, evidence of a cardiac sphincter has been detected. The vagus makes this sphincter relax, and the sympathetic causes it to contract.

In the author's opinion the fact that his patient was born six weeks prematurely suggests the possibility of incomplete development of the vagus nerve supply of the involved segment of esophagus with consequent lack of relaxation. Under such conditions air swallowing to increase the size of the

bolus and the pressure within the esophagus would probably result in the uniform type of dilatation found

MILLARD F ARBUCKLE MD

King E S J The Surgical Treatment of Carcinoma of the Thoracic Esophagus *Med J Australia*, 1936 1 399

While admitting the almost hopeless outlook in carcinoma of the esophagus at the present time King offers encouragement to those interested in the treatment of the malady. The frequency with which patients with this condition first come for treatment he ascribes to a number of factors chief of which are the almost complete absence of symptoms until mechanical obstruction occurs and the frequent failure of physicians to make proper x ray and endoscopic examinations. Most cases in his service as elsewhere are seen first after it is too late to hope for cure by any treatment.

According to King's experience the early symptoms are a mild intermittent obstruction which clears up completely, vague substernal discomfort associated with the taking of food and a girdle pain in the thorax which also may be associated with eating. Food especially solid food seems to stick at one particular place. However in many of the author's cases such symptoms were absent. In many others they had been entirely overlooked and their occurrence was learned only by questioning. While such symptoms may of course be due to esophagitis not associated with carcinoma they should be regarded as significant and their cause carefully investigated if they persist for more than a fortnight. They occur most frequently after the fortieth year of age but should not be disregarded in persons under that age as carcinoma of the esophagus has been found not infrequently in persons well under forty and even in persons in the second decade of life.

The first and most important step in the diagnosis of the condition is x ray examination. As the lesion is easily overlooked the radiologist should be informed that carcinoma of the esophagus is suspected. Special detailed roentgenograms may then be made. In cases of dysphagia King always disregards a negative x ray report and proceeds with esophagoscopy. This is a sure way of completing the diagnosis but its dangers must be carefully considered. Unless the examination is carried out skillfully it may be followed by hemorrhage, mediastinitis or pneumonia. When the growth is at or above the level of the sixth thoracic vertebra bronchoscopy should always be performed. The discovery of bronchial or tracheal invasion, which is common, will save much unnecessary effort. King insists that biopsy should be done in every case and calls attention to the necessity for taking tissue from deep within the tumor in order to avoid a mistaken diagnosis based on a specimen from the inflammatory tissue surrounding the tumor. He emphasizes that the combined evidence obtained by all methods of observation is more important than a negative

microscopic report and that the patient should be subjected also to general study including an ordinary x ray examination and a Wassermann test.

King's experience with irradiation in carcinoma of the esophagus like that of others has been unsatisfactory. He has therefore devoted his attention almost entirely to operative removal of the growth. He prefers Torek's technique because it offers the best chance of dealing with the condition adequately. By this method good exposure is obtained with minimal blind dissection, an adequate amount of the esophagus may be removed, and the condition of the mediastinum and left lung can be determined.

The method employed by King is a slight modification of the method described by Eggers as being used at the Lennox Hill Hospital, New York. The esophagus is approached posteriorly through the seventh or sixth intercostal space with cutting of the vertebral ends of the seventh to fourth ribs. By this means a wide exposure of the left pleural cavity and the mediastinum is obtained. The esophagus is dissected out of the mediastinum and then cut across at the lower end. The lower portion is inverted into the stomach and the main portion freed completely by bringing it around the arch of the aorta. Next an incision is made in the neck and a communication established between the neck and the upper part of the mediastinum. The esophagus is then brought through the neck incision where it is sutured to the fascia and skin at the site of its emergence and the redundant part, containing the tumor is amputated. The chest is then closed and the lung allowed to expand the anesthetist using slight positive pressure just as the last sutures are inserted.

The difficulties and dangers of the operation and the postoperative treatment required are described in detail. Preliminary pneumothorax is of value. During the operation the most meticulous care must be taken to prevent infection both from the field and from extraneous sources. Postoperative drainage is essential.

In a detailed discussion of the problem of operability King states that further experience is needed to establish criteria.

Methods of forming a new esophagus are discussed.

In summarizing the author states that while at the present time the incidence of postoperative recovery is only 8 per cent, it will doubtless be increased with improvement in surgical technique, diagnostic methods, the selection of cases for operation and the operative technique.

MILLARD F ARBUCKLE MD

Edwards A T Extirpation of the Esophagus for Carcinoma *J Laryngol & Otol* 1936 51 231

In the treatment of carcinoma of the esophagus apart from palliative measures such as gastrostomy and intubation only two methods of procedure are possible namely irradiation and radical surgery.

The results of irradiation thus far have been little more than the prolongation of life for a few months. Although the majority of patients with the disease are poor operative risks, the author and others have obtained successful operative results which have encouraged them to persevere with surgical treatment.

Attempts at extirpation of carcinoma of the esophagus may be divided into two main groups, partial and complete esophagectomies. Partial procedures are likely to be unsuccessful because of the lack of a serous covering, the relatively friable nature, and, the relatively poor blood supply of the esophagus and because of the liability of sutures to tear through on account of tension. Attempts at reconstruction of the esophagus by skin flaps as advocated by Lilienthal have the following disadvantages: (1) a tendency to limit the segment of esophagus that is removed and hence to increase the risk of recurrence, (2) a tendency toward the formation of strictures at the suture lines.

The author believes that total removal of the thoracic esophagus with the formation of an ante-thoracic subcutaneous tube from skin flaps is the method most likely to be successful. Three routes of approach have been employed, the mediastinal, the collo abdominal, and the transpleural. The mediastinal route was used in the hope of avoiding entry and contamination of the pleura. However, the pleura is frequently torn in the course of the operation, and when it remains intact secondary effusion into the pleura is common. Moreover, the exposure is limited. In the use of the collo abdominal route, the lower end of the esophagus is exposed by way of the abdomen. Then, after the esophagus has been separated from the diaphragm and dissected from its mediastinal bed, an incision is made in the neck and the upper end of the esophagus is exposed. When the separation is complete from both ends the esophagus is divided and withdrawn. This operation is of advantage because, on account of its simplicity and brevity, it is attended by relatively little shock. The chief objection to it is the impossibility of dealing with hemorrhage and of recognizing the development of a pneumothorax on one or both sides. The use of the transpleural route provides complete exposure, but is a major procedure. Postoperative drainage into the left pleura is free, and infection can be dealt with by drainage of the pleura. The exposure usually requires the removal of one rib and possibly the division of a rib above or below. Pre-operative gastrotomy, carried out well toward the pyloric end of the stomach, should be done under local anesthesia. High caloric feedings through the gastrotomy tube and transfusions are recommended. Pre-operative oral hygiene is essential. Operative shock may be reduced by the induction of left-sided pneumothorax begun about twelve days prior to the operation. According to the author's experience, shock is lessened also by the use of high spinal anesthesia. During the freeing and extirpation of the upper

portion of the esophagus through the neck wound, positive pressure anesthesia induced with nitrous oxide and oxygen is used. The exposed wound and pleural surfaces are protected by packs soaked in a warm 1:1,000 solution of flavine. The pleura is drained by an intercostal tube brought out under water. Postoperatively large quantities of fluids are given. Inhalations of oxygen with a 7 per cent admixture of carbon dioxide are administered at regular intervals.

The author has operated upon eight cases of carcinoma of the esophagus. One patient survived the operation for seven months and died of local metastases. Another survived for twenty-one days and died of purulent pneumonitis. The others died within short periods after a radical operation or after an exploration which revealed inoperable lesions.

ARTHUR S. W. TOUROFF, M.D.

MISCELLANEOUS

Harrington, S. W. The Surgical Treatment of 105 Cases of Diaphragmatic Hernia. *Illust J Surg, Obst & Gynec*, 1936, 44: 2-5.

Harrington states that the incidence of diaphragmatic hernia is probably no greater now than it was twenty years ago. The more frequent recognition of the condition in the last two decades is attributable primarily to the clinician and the roentgenologist. At the Mayo Clinic, 30 cases were recognized clinically and 19 were treated surgically in the period from 1900 to 1925, and 197 cases were recognized and 105 were treated surgically in the period from 1925 to 1935.

The condition may be termed the "masquerader of the upper abdomen" because its symptoms so frequently simulate those of other diseases. In 105 cases the most common erroneous diagnoses, in order of frequency, were cholecystitis, cholelithiasis, gastric ulcer, duodenal ulcer, hyperacidity, secondary anemia, cardiac disease, cancer of the cardia, stricture of the esophagus, appendicitis, and intestinal obstruction. In 19 of these cases the patients had been operated on previously for other conditions, without complete relief of symptoms, and were completely relieved following repair of the hernia.

The symptoms depend on the amount of mechanical interference with the function of the herniated abdominal viscera, the degree of interference with normal function of the diaphragm, and the amount of increase in pressure which the herniated viscera produce within the thorax, causing impairment of respiration and circulation. To some extent they depend also on the type of hernia present, whether it is congenital or acquired, and whether or not trauma was an etiological factor. Because of the clinical and surgical significance of trauma, Harrington has suggested that diaphragmatic hernias be classified into 2 main groups, the non-traumatic and the traumatic. These groups he has subdivided according to the various types.

A non traumatic diaphragmatic hernia may be congenital or acquired. If it is congenital it is attributable to embryological deficiency and usually is without an enclosing hernial sac. Congenital non traumatic diaphragmatic hernias occur most frequently through (1) the hiatus pleuroperitonealis (foramen of Bochdalek) (2) the dome of the diaphragm, (3) the esophageal hiatus (4) the foramen of Morgagni, and (5) the gap left by partial absence of the hemidiaphragm, which is usually in the posterior portion of the muscle.

Non traumatic diaphragmatic hernias acquired after birth occur (1) through the esophageal hiatus (those of this type have an enclosing hernial sac), (2) through the region of fusion of the anlage of the diaphragm and (3) at the sites of hernias of the congenital types.

Traumatic diaphragmatic hernias may be caused by direct or indirect injury or by inflammatory necrosis of the diaphragm.

In indirect injury to the diaphragm the hernia may occur at any point but the most common site is the dome and posterior half of the left hemidiaphragm. It is usually the result of a severe crushing injury and it may or may not have a hernial sac. When it occurs through the esophageal opening there is a sac but when it occurs through the leaf of the diaphragm there usually is no sac.

In direct injury to the diaphragm the hernia may occur at any point and is usually the result of a penetrating wound such as may be inflicted by a bullet or a knife.

Rupture of the diaphragm may be the result of inflammatory necrosis caused by a subdiaphragmatic abscess or by drainage tubes introduced into empyema cavities. In this condition the opening in the diaphragm is usually posterior and there is no hernial sac.

Cases presenting clinical syndromes associated with various types of diaphragmatic hernia may be divided into 2 main classes depending on the abdominal viscera involved in the hernia. The first class consists of those in which the stomach is the only abdominal viscus incorporated in the hernia. In such cases the hernia is usually para esophageal. In the cases of the second class the intestines with or without involvement of the stomach and other abdominal viscera are included in the hernia. In such cases the hernia is usually traumatic and therefore of the acquired type or non traumatic and of the congenital type due to structural deficiency of the diaphragm.

Harrington has examined the esophageal hiatus in the course of 1000 abdominal operations for conditions other than diaphragmatic hernia. In 55 per cent of the cases the esophageal ring was closely approximated to the esophagus by loose areolar tissue and there was no appreciable space between the two structures. In 35 per cent at least 1 finger could be placed between the esophagus and the margin of the esophageal ring. In 8 per cent 2 fingers and in 2 per cent 3 fingers could be inserted. Harrington

believes that when 1 or 2 fingers can be inserted between the esophagus and the esophageal ring the diameter of the hiatus is within the normal limits. In cases in which 3 fingers could be inserted through the opening, he had special roentgenograms made subsequently. In 2 such cases a small hernia was found.

Para esophageal hernia is the most common hernia through the diaphragm in adults. It is a true hernia as a hernial sac is formed of diaphragmatic peritoneum which fuses with the serosa of the stomach. The symptoms of para esophageal hernia may begin at birth or at any time of life. They are more uniform than those of hernias elsewhere in the diaphragm. They are those of intermittent and usually progressive incarceration and obstruction of the stomach. At the onset, the attacks are usually mild. They consist of epigastric distress that is projected through to the back. As a rule they occur in the course of or shortly after, a heavy meal but sometimes may be brought on by the taking of any thing such as a cup of coffee into the empty stomach. They are usually similar in character, but vary a great deal in intensity depending on the amount of incarceration and fixation of the stomach in the hernial opening. They are usually relieved by the belching of gas and vomiting. As more of the stomach becomes incorporated in the hernia, they become more severe. The pain is projected straight through to the back and the lower left side of the thorax is more marked to the left of the spinal column, and often is felt between the shoulder blades. The pain may be agonizing. Spasm of the diaphragm produces hour glass deformity of the stomach which interferes with emptying of the upper lobe and causes increased intragastric pressure. The pressure of the herniated portion of the stomach on the lower part of the esophagus interferes with the belching of gas and vomiting.

Spasm of the diaphragm is commonly accompanied by phrenic pain which is referred to the left shoulder and at times extends down the left arm. The increased pressure in the thorax causes cardiac embarrassment with palpitation and tachycardia. Pressure on the lung and interference with the motion of the diaphragm cause dyspnea. These symptoms are augmented when the patient lies down. The attacks may last for from a few minutes to several hours. There is often an interval of weeks or months between the attacks. When the attacks become more or less constant the stomach has usually become fixed in the thorax by adhesions. There is loss of weight from inability to retain food and from marked restriction of the diet. During the severe vomiting the vomitus may contain blood. Many patients present a fairly characteristic syndrome of ulcer are given medical care, and obtain partial relief because they take a restricted amount of food at frequent intervals. Hemorrhage is not a common sign. It is usually indicative of severe incarceration. Harrington has never seen strangulation of the stomach from hernia.

In para esophageal hernia the symptoms may be those of esophageal obstruction. They may be attributable to an entirely unassociated lesion of the lower part of the esophagus, such as cardiospasm, carcinoma, or diverticulum, or may be the result of ulceration or stricture of the esophagus caused by the hernia. An esophagosopic examination is advisable in all cases.

The symptoms of traumatic hernia and of non-traumatic, congenital types of hernia in which only the stomach is involved in the hernia are essentially the same as those described, but usually more severe and acute. Cases of this sort are relatively rare. In most cases the large and small bowel as well as the stomach and spleen, and occasionally the liver, are involved in the hernia. There is no limiting sac. The most marked immediate symptoms are usually those of respiratory and circulatory embarrassment. Later, severe hemorrhage from the gastro-intestinal tract may occur. If the patient survives the acute condition, the later symptoms depend upon the viscera involved. They include obstinate constipation, large quantities of gas in the colon, and attacks of partial or complete intestinal or gastric obstruction. The sudden onset of symptoms in traumatic cases is usually related directly to the injury, and there is rarely any question as to the clinical diagnosis. Surgical treatment is demanded because of the danger of cardiac and respiratory failure or intestinal strangulation.

The only type of diaphragmatic hernia that may be treated conservatively is hernia through the esophageal hiatus in which only a small portion of the cardiac end of the stomach is involved and the symptoms are mild. The operative procedures in the 105 cases on which this article is based were as follows:

In 42 cases the phrenic nerve was either temporarily or permanently interrupted as a measure preliminary to operative repair of the hernia. In 8 cases permanent interruption of the left phrenic nerve was done as a palliative measure. In 5 of the latter the hernias were para esophageal and operation was contra-indicated. In the remaining 3, the herniation of the stomach was attributable to a congenitally short esophagus for which the procedure was done as a therapeutic test. It may be necessary to carry out a radical procedure in these cases later for complete relief of the symptoms. In 97 cases the herniated abdominal viscera were replaced in the abdomen and the abnormal opening in the diaphragm was repaired. In 2 of the latter a combined thoracic and abdominal approach was employed, in the remaining 95 the abdominal approach was employed. In 1 case a Pola type of gastric resection was done at the time of operation for a gastric ulcer high in the lesser curvature of the stomach. In 1 case posterior gastro-enterostomy was performed for a large duodenal ulcer causing almost complete obstruction of the pyloric end of the stomach. In 1 case the spleen was so firmly adherent to the margins of the opening and the thoracic dia-

phragm that it was torn during the operation and its removal was necessary. In 1 case, appendicostomy was performed at the time of the operation because of marked dilatation of the colon which had resulted from partial obstruction that occurred when it was in the thoracic cavity. In 5 cases there was moderate congenital shortening of the esophagus associated with the hernia. The diaphragm could be sutured entirely above the stomach after the diaphragmatic muscle had been paralyzed by phrenicotomy. In 1 case, extrapleural thoracoplasty was performed preliminary to repair of the hernia.

There were 7 postoperative deaths. Five of them occurred in cases of congenital hernia and 2 in cases of traumatic hernia. Four occurred in the first seventy-two hours from respiratory and cardiac failure, and 3 in the second week from pneumonia.

The results in the cases of the 98 patients who recovered from the operation were as follows:

Of the 8 patients who were treated palliatively by interruption of the phrenic nerve, 1 has since died of angina pectoris, 2, one of whom was seventy-two years and the other seventy-four years of age, died of causes which were not definitely ascertained but were apparently attributable to cardiac conditions as they had had myocardial degeneration at the time of the operation, and 5 have obtained partial relief of symptoms. Of 90 patients who recovered from radical operative repair of the hernia, 88 have been completely relieved of symptoms and 2 have had a return of symptoms following recurrence of the hernia. In 1 of the latter the recurrence developed following an influenza type of pneumonia three months after the operation. It was caused by the severe strain of coughing. The cause of the recurrence in the other is not known. All patients have been examined roentgenologically at intervals of from six months to a year since the operation.

After operation most patients are immediately placed in the oxygen chamber and given fluids intravenously for the first two to three days. In all cases in which there has been marked dilatation of the stomach it is advisable to pass a small tube into the stomach for the first two or three days after the operation. In many cases there is considerable shock during or immediately after the operation. If the blood pressure falls to less than 80 mm of mercury, the patient should be given a transfusion of blood or a solution of acacia intravenously. This is advisable also in all cases in which the hernia is associated with marked secondary anemia. The blood of every patient should be grouped for transfusion before the operation. In cases in which there has been herniation into the thoracic cavity of a large portion of the abdominal viscera over a long period of time, replacement of these viscera into the abdomen causes a marked increase in the intra-abdominal pressure which may lead to partial or complete obstruction. Partial obstruction may be relieved by conservative measures, but in cases of complete obstruction it may be necessary to perform an enterostomy or colostomy to reduce the intra-

abdominal pressure and relieve the obstruction. In all cases in which the herniated viscera are removed from the pleural cavity and in most cases in which the herniated viscera are removed from the posterior mediastinum as in hernia through the esophageal hiatus there is traumatic effusion in the pleural cavity. In most instances the effusion is slight and will gradually become absorbed. Special treatment is not required. In cases in which the effusion progresses until it produces respiratory embarrassment pleurocentesis one or more times, is required. In some cases empyema may develop requiring intercostal drainage and possibly later rib resection. In Harrington's experience empyema has never occurred in cases in which the hernia was repaired by the abdominal approach. In some cases atelectasis may be caused by mucus in the bronchus. In the majority of such cases the condition will respond to conservative treatment. Removal of the mucus by bronchoscopic aspiration may sometimes be necessary.

Costantini H. and Bonafos M. Ruptures of the Diaphragm (Les ruptures du diaphragme). *Arch. med. chir. et d'appar. respir.* 1936 15 115

The authors consider only true ruptures of the diaphragm from sudden abdominal pressure caused by traumatism or violent effort, excluding from their discussion wounds of the diaphragm accompanying skin wounds and injury of the diaphragm by a fragment of the rib which are wounds rather than ruptures. This differentiation between these lesions is easy in fresh cases but difficult in old ones.

In 1933 Bonafos was able to collect 133 cases of rupture of the diaphragm from the literature and 3 unpublished cases. The authors believe that many more cases would be discovered if autopsies were performed routinely in all cases of abdominal injury and if systematic roentgen examinations were made in all cases of serious wounds of the abdomen.

Rupture of the diaphragm occurs most frequently in adult males as injury is more frequent in this group. It might be supposed that it would occur often in women as the result of the effort of delivery, but only a few cases due to this cause have been reported. Many more diaphragmatic ruptures are produced by contusion than by effort.

The action of trauma on the diaphragm is indirect. Its effect is a sudden and excessive increase of the intra abdominal pressure. Factors which predispose to rupture of the diaphragm are congenital imperfections of the diaphragm and excessive filling of the stomach. An increase in abdominal pressure alone is not sufficient to cause such a rupture. There must be a disequilibrium in the abdominal and thoracic pressure. When the glottis is functioning normally the abdominal and the thoracic pressure are kept equal but if for any reason such as suddenness of the trauma the glottis does not contract at

the time of the injury a disequilibrium is created between the abdominal and thoracic pressure and the diaphragm is forced by the high abdominal pressure into the thorax until it reaches the limits of its distensibility and ruptures.

The rupture may take place in the tendon alone, the muscle alone, or both. The most common site of rupture is the left side probably because the right side is protected by the liver. Phrenocostal diaphragm insertion is very frequent, but has not been studied.

The usual symptoms of rupture of the diaphragm are those of a severe abdominal injury with shock, pallor, rapid pulse, hypothermia, and hypotension. Sometimes the patient experiences a tearing sensation on the left side and a feeling that the stomach has risen into the thorax. When the stomach rises into the thorax the face is sometimes very cyanotic and sometimes irritation of the diaphragm causes a sardonic grin. Some patients have a dry cough and some suffer from dry vomiting that is, they attempt to vomit but are unable to do so because of herniation and volvulus of the stomach which prevent evacuation. There may be an abnormal arching of the base of the thorax due to the presence of the stomach in that region. There is no subchondral depression such as is seen during expiration under normal conditions. On auscultation, bor borygmus is sometimes heard in the thorax. The diagnosis is made with greatest certainty by systematic roentgen examination in all cases of serious abdominal injury.

In recent rupture of the diaphragm the dominant symptom is shock. In the authors' opinion the corrective operation should be delayed until the shock is over. It is probably best to delay this procedure for two weeks. Phrenicectomy should be performed at once. This slight operation can be performed at the neck, renders the future operation easier and to a certain extent attenuates the conditions which favor evisceration into the thorax. The corrective operation should be that for diaphragmatic hernia. In some cases it may be necessary to operate for injury of the viscera as soon as the patient is able to bear intervention. In such cases it is better to delay the operation on the diaphragm for some time after the operation for repair of the visceral lesions. In the closure of the rupture in the diaphragm the muscle should be sutured from the abdominal side if possible without opening the thorax. The patient should be prepared for the operation by the free administration of glucose solution by mouth. The operation should be as brief as possible. Even incomplete closure is better than too great prolongation of the operation. As a rule general anesthesia is to be preferred. In some cases however high spinal anesthesia has proved satisfactory. Plastic operations are generally not to be recommended.

AUDREY GOSN MORGAN M.D.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Chauvenet, A., Broustet, P., and De Saint-Cyr, G. C. Encysted Pneumococcal Peritonitis with a Subacute or Chronic Course (Les peritonites pneumococciques enkystées à évolution subaiguë ou chronique) *J de med de Bordeaux* 1936, 113 303

The authors report three cases of encysted pneumococcal peritonitis with a subacute or chronic course and cite three others previously reported in Swiss and French journals. The youngest patient was eight and a half years old and the oldest seventy years.

This rather rare condition is most common in older adults. It seems to have no relation to sex. As a rule it follows an infection of the lungs or pleura. For a considerable time it causes few symptoms.

The tumor mass formed by the encysted pus is most often confused with tuberculous peritonitis and chronic appendiceal abscess. Other conditions to be ruled out in the diagnosis are hydatid cyst, pyonephrosis, and empyema of the gall bladder.

The treatment indicated is surgical drainage of the abscess.

MARSH W. POORE, M.D.

Uggeri, C. Retractable Mesenteritis in Common Mesentery (Mesenterite retrattile in mesenterium commune) *Arch ital di malattie dell'apparato digerente* 1936 5 183

The so called common mesentery is no longer considered a rare malformation as it has been found associated with various intestinal disturbances. However, the author has been unable to discover in the literature any record of typical retractile mesenteritis localized in the mesentery of a dystopic intestine. In this article he reports a case of the latter condition.

The patient was an unmarried woman twenty-three years old whose family history was negative. At the age of eighteen years she had had an illness accompanied by pallor, loss of weight, asthenia, headache, loss of appetite, and digestive disturbances, which was diagnosed as anemia. After about three months there was some improvement in her general condition, but bowel movements occurred only once in from two to four days. The bowel movements were always spontaneous. At the age of twenty-one, the patient suffered an acute abdominal attack for which appendectomy was done. Even during her convalescence from the appendectomy the abdominal disturbances continued. They consisted essentially of epigastric distress of varying intensity which occasionally spread throughout the abdomen and sometimes radiated to the back. The

attacks were not related to meals. They varied in duration from a few minutes to several hours. The condition was accompanied also by anorexia, a sense of weight after meals, pallor, occipital headaches, and a gradual loss of weight and strength. The constipation increased until no bowel movements occurred without a purge or enema. Occasionally, for a day or two, there was an increase in the abdominal pains with borborygmi and swelling of the abdomen. After a bowel movement these ceased. Many methods of treatment with drugs were attempted over a period of two years, but were of no benefit.

Physical examination at the time of the patient's entrance to the hospital revealed diffuse tympany of the abdomen, especially in the left and lower portions, and tenderness in the epigastrium and lower third of the abdomen on deep palpation. A limited area in the midline just above the pubis was especially tender. No abnormal masses were discovered. Examination of the blood disclosed a moderate secondary anemia.

In the roentgenological examination the stomach was found normal and the duodenal bulb regular. The second and third portions of the duodenum turned to the right instead of to the left. The entire jejunum and ileum were situated along the flank and in the right iliac fossa. The intestinal loops were painless and easily separated. The colon was situated entirely in the left side of the abdominal cavity. The cecum was in a median position and low, completely fixed to the hollow of the sacrum, and tender on pressure. The transverse colon was folded along the left flank and the descending colon was next to the cecum. Injection of the colon required considerable time, and its evacuation was even more difficult. After three days, opaque material was still present in the cecum.

The findings were typical of "common mesentery." On surgical exploration under spinal anesthesia the entire colon was found situated to the left of the ileal mass. The cecum was ptotic, occupied the true pelvis, and lay immediately upon the sigmoid. The ascending and the transverse colon presented two dilated regions separated by a segment of normal colon. The descending colon and the sigmoid colon were apparently normal. Of particular interest was the presence in the ascending segment, of a mesocecum about four fingers wide which presented all the signs of mesenteritis. This mesocecum averaged about 3 cm in thickness and was consistently firm, fibrous, and rigid. Its surface was smooth and shiny. Occasional yellow zones were noted in the thickened portion. Evidently the zones of colonic dilatation were related to this pathological portion of the mesocolon. The terminal

50-cm portion of the ileum was dilated and its walls were thickened and hypertrophied

An ileosigmoidostomy was performed Two months after the operation the patient's condition was very much improved

The author reviews the literature He believes that the pathogenesis of the condition is related to intestinal stasis with the absorption of toxic substances with concomitant circulatory disturbances

A LOUIS ROSE M D

GASTRO-INTESTINAL TRACT

Aird I Intestinal Obstruction *Edinburgh M J*, 1936 43 375

Since the beginning of the present century the operative mortality in cases of intestinal obstruction has remained steady at the high level of 40 per cent Although in experiments on animals acute intestinal obstruction can be produced readily and its effects on the organism easily determined the extensive knowledge gained from such experiments has not as yet been widely applied in treatment

In this article the author discusses the relation ship to clinical practice of certain recent experimental findings He classifies acute intestinal obstruction as follows

A Simple occlusion (1) high obstruction of the small bowel (2) low obstruction of the small bowel (3) obstruction of the colon

B Closed loop obstruction (1) loops with sterile contents (2) loops with heavily infected contents (3) loops with mildly infected contents

C Strangulation (1) sudden anemia (2) venous congestion (3) short, long, and medium sized loops

D Neurogenic obstruction (1) spastic ileus (2) adynamic paralytic ileus

Wilkie Haden and Orr Draper Maury and many others have shown that in simple occlusion of the high type all of the phenomena are dependent upon the loss to the organism of water and inorganic ions which poured into the stomach and duodenum in enormous quantities as digestive juice, fail to pass beyond the obstruction to be absorbed by the intestine below The progressive loss of water leads to an increasing dehydration the degree of which is indicated by dryness of the skin increasing thirst, and a diminution of the urinary output The blood becomes increasingly concentrated the erythrocyte count and the hemoglobin rise the viscosity of the blood increases the sedimentation rate time becomes prolonged and the total blood volume is reduced The accompanying loss of the inorganic ions of the gastric pancreatic biliary, and duodenal juices lessens the electrolyte, chloride, sodium and potassium content of the blood The body attempts to maintain the chloride level by complete retention of chlorides from the urine and the passage of chlorides from the tissues to the blood The electrolyte content of the blood must be maintained and the lost chloride must be replaced As the blood chlorides fall, the bicarbonate content rises and

alkalemia results Coincident and parallel with the fall in the blood chlorides is a rise in the non protein nitrogen and urea of the blood

All of these phenomena—dehydration, hypochloremia, and alkalemia—therefore depend primarily upon the loss of water and sodium chloride from the digestive juices The most rapidly fatal form of simple occlusion results when the obstruction is located just below the entrance of the biliary and pancreatic ducts—the 'lethal line' of Draper Maury

The treatment of duodenojejunal occlusion is the well known gastric lavage and the intravenous administration of saline solution followed by removal of the obstruction or a short-circuiting operation after the dehydration and hyperchloremia have been relieved Hypertonic saline solutions have no place in the treatment of high occlusion Only physiological saline solution should be administered Hypertonic saline solution may even be harmful The quantities of saline solution usually given are inadequate A patient suffering from high obstruction may lose 8 liters of fluid in twenty four hours The saline solution should be given intravenously until the blood chloride level approaches the normal A safe procedure consists in washing out the stomach and giving 2 liters of saline solution intravenously and slowly Dehydration is manifested by a parched condition of the tongue dryness of the skin and concentration of the urine If a drop of silver nitrate solution is added to acidulated urine the appearance of a white precipitate indicates the presence of chlorides If the urine contains chlorides the blood chloride is sufficiently high for operation to be performed safely

In occlusion of the lower ileum—the common clinical form of obstruction of the small bowel—vomiting is a late feature The digestive juices continue to be absorbed until late in the course of the condition Even in the later stages, dehydration is relatively slight and the maximum loss of blood chlorides is only 30 per cent Therefore there is no great change in the alkali reserve and no great elevation in the non protein nitrogen

Formerly the theory that death from intestinal obstruction was due to bacterial toxins was widely accepted It is now agreed quite generally that no bacteremia occurs in intestinal obstruction *in man*

Sudden relief of intestinal obstruction is followed by a rise in the blood pressure Sudden release of a long continued distention of the bowel with severe cyanosis is likely to be followed by a dangerous fall in the blood pressure Therefore the surgeon should hesitate to drain a grossly distended bowel suddenly Wangenstein's suggestion of pre operative nasal drainage appears excellent as this procedure would prevent sudden flooding of the general circulation by depressor blood from the recovering bowel Wide excisions of bowel seem inadvisable under any conditions No loop of bowel should be excised unless it has obviously lost its vitality A doubtful loop should usually be left

In the majority of clinical cases simple occlusion of the colon is the result of carcinoma. Since it becomes acute only after the tumor has been present several months, the changes of acute obstruction become superimposed upon those of the chronic type. Before the obstruction becomes complete, the bowel is already dilated, its muscle walls are hypertrophied, and the mucosal wall is not infrequently the site of stercoral ulceration. The patient is often cachectic and in poor general condition. As a result of the obstruction the intracolonic pressure may reach a high level. Perforation of the colonic wall may occur through a stercoral ulcer with consequent fatal peritonitis.

In the experimental animal, colonic occlusion is the most slowly fatal of all forms of acute intestinal obstruction. An animal with complete occlusion may live untreated for as long as thirty days. There is no significant change in the blood chlorides. The blood urea and non-protein nitrogen are only slightly elevated. The treatment suggested for the condition is drainage by gradual decompression of the bowel.

Wilkie demonstrated that in closed loop obstruction of the bowel the pathological course depends upon the degree to which the contents of the loop are infected. If the contents of a doubly obstructed loop are sterile, the loop merely distends slowly as a mucocele. The best example of such a condition is mucocele of the appendix. The best clinical example of obstruction of a loop with heavily infected contents is obstructive gangrenous appendicitis. Such a loop contains grossly infected fecal material. The organisms multiply rapidly, gas accumulates in the lumen, the intra loop pressure increases rapidly, fluid and leucocytes are poured into the lumen, and a pyocele forms rapidly. The increasing pressure interferes with local circulation, organisms enter the devitalized bowel wall, and gangrene perforation and peritonitis result.

The author's scheme of treatment for the various forms of intestinal obstruction is as follows:

Simple occlusion in high obstruction of the small bowel: the administration of physiological saline solution until chlorides appear in the urine followed by operative relief of the obstruction.

Low obstruction of the small bowel in which chlorides are absent from the urine: the intravenous administration of saline solution until chlorides reappear in the urine.

Obstruction associated with marked venous congestion: gradual decompression.

Colonic obstruction: gradual deflation of the bowel.

Closed sterile loop obstruction: resection of the loop.

Obstruction of a loop with heavily infected contents: resection.

Obstruction of a loop with mildly infected contents: the treatment for low bowel obstruction.

Long loop obstruction: blood transfusion followed by the treatment given for obstruction of a loop of medium length.

Obstruction of a loop of medium length: blood transfusion and removal of the toxic transudate from the peritoneal cavity followed by resection or exteriorization of the involved loop.

JOHN W. NUZZUM, M.D.

Knight, G. C., and Slome, D. Intestinal Strangulation. *Brit J Surg*, 1936 23 820.

The early onset of circulatory collapse is an outstanding feature of severe cases of intestinal strangulation and serves to differentiate the condition from simple intestinal obstruction. Because of their comparatively long latency, hypochloremia and loss of circulating fluid cannot be held accountable for it.

Murphy and Vincent first demonstrated that in strangulation of the bowel in cats the height of the toxemia, as manifested by a fall in the blood pressure, was reached within from four to six hours, whereas in simple obstruction no effect was apparent at the end of that time. They found also that there was no essential difference in the time of death of animals suffering from high intestinal strangulation as compared with those suffering from low intestinal strangulation. They concluded that blockage of the venous return is the important factor in the production of the rapid intoxication. Knight and Slome report a series of experiments which they carried out to evaluate the various factors responsible for death under such circumstances.

Two types of experimental strangulation were produced. The first was the "non-viable" or "black loop" type. This was caused by tying a ligature around the bowel at each end of the selected segment. The marginal vein at the border of the bowel was ligated and the individual veins in the mesentery draining the affected segment were tied off. The arteries and lymphatics were left patent. Within twenty-four hours the involved segment of bowel lost its "viability" although no actual gangrene occurred. The lumen became distended with hemorrhagic fluid. The peritoneal fluid was copious and blood stained, and possessed a characteristic odor. The second type of experimental strangulation was the "viable" or "pink loop" type. This was produced by tying the obstructing ligatures lightly. The gut and mesentery were then surrounded by a rubber band, the tension of which was adjusted until the veins appeared full and there was a slight congestion of the mesentery and bowel. The gut became a dark pink, but retained its "viability" at the end of twenty-four hours. The lumen became distended with fluid. The peritoneal fluid was copious, clear, and odorless.

The authors first confirmed the findings of Murphy and Vincent. By measuring the fluid loss in loops of various lengths, they demonstrated conclusively that there was no constant relationship between the amount of the fluid lost from the circulation and the survival period, and that fluid loss played only an accessory role in the production of circulatory collapse resulting from strangulation in the mid portion of the small bowel. They demon-

strated also that fluid loss was inadequate to account for death even in very long loop obstruction.

They next investigated the toxic factor assumed to be responsible for death. Peritoneal fluid derived from animals with a black loop when injected intravenously into normal animals always depressed the blood pressure provided the fluid was obtained within a short time after the onset of strangulation. Numerous dropped heart beats in the injected animals suggested that the toxic substance had some cardiac effect. A similar series of injection experiments in which pink loop peritoneal fluid was used showed no evidence of the presence of a toxic substance. The authors next showed that the depressor substance could be demonstrated in the peritoneal fluid within from sixty to seventy minutes after the production of severe strangulation and that the severity of the strangulation governed the time of its appearance in that fluid.

It was then shown that the blood in the mesenteric veins draining the involved loops possessed the same toxic properties as the peritoneal fluid. In cases of non viable loops the mesenteric blood always contained a large amount of depressor substance. In cases of viable loops it contained an amount of depressor substance less than or equal to that found in cases of non viable loops. Cannulization of the superior mesenteric vein demonstrated the appearance of the toxic substance in the blood within from thirty to sixty minutes after the onset of strangulation. The toxin was found to be readily dialyzable through a semipermeable membrane. The rapid appearance of the substance seemed to rule out the possibility of a bacterial origin.

In a series of experiments in which the washings of unstrangulated and strangulated loops of bowel were tested it was found that the washings of the former were non toxic while those of the latter were toxic. At the same time the mesenteric blood of water filled unstrangulated loops was non toxic while the mesenteric blood of water filled strangulated loops was toxic. These experiments tended to demonstrate that the depressor substance arose in the wall of the bowel itself and passed from there into the lumen and into the venous blood. Since it was not present in the lumen before strangulation and since the rapidity of its formation in high concentration appeared to rule out a bacterial origin it appeared that the toxin resulted from intrinsic changes in the bowel wall consequent to venous strangulation. This concept of the origin of the toxin is supported by the experimental work of others.

At postmortem examination of animals in which strangulation of the bowel was produced by venous ligation alone the mesenteric lymphatics being left patent, the lymphatic channel at the mesenteric root and the thoracic duct itself were found to contain dark fluid. This was noted also in all of the black loop cases. Within thirty minutes after the production of superior mesenteric strangulation the fluid in the thoracic duct changed color and depressor substance appeared in the duct fluid within

from forty to seventy minutes after the strangulation. The experiment showed that in cases in which the mesenteric lymphatics are patent the absorption of toxic substance may occur directly into the thoracic duct and thence into the systemic circulation. When the lymphatics were occluded by compression of the mesentery depressor substance could not be demonstrated in the thoracic duct unless it was present also in the peritoneal fluid. In the latter case absorption appeared to be secondary from the peritoneum. This was confirmed by the fact that trypan blue introduced into the peritoneal cavity appeared in the thoracic duct within twenty minutes. From these experiments the authors concluded that any toxic substance passing into the peritoneal cavity or into a closed off hernial sac may find its way into the general circulation by way of the lymphatics and thoracic duct.

In another set of experiments it was noted that when venous or lymphatic obstruction was relieved depressor substance was absorbed much more rapidly and collapse ensued. In view of the fact that relief of venous obstruction permits the return of blood into the circulation and therefore tends to correct fluid loss it would seem that if fluid loss were the cause of the symptoms of intestinal strangulation as claimed by some this procedure should be followed by improvement in the patient's condition. The fact that the opposite occurs tends to confirm the theory of the toxic factor and to disprove the fluid loss theory.

The authors were unable to demonstrate the presence of depressor substance in either the carotid or heart blood of animals dying of experimental strangulation nor in animals to which intravenous injections of toxic material had been given. Whether this was due to rapid fixation or detoxification in the tissues or rapid excretion from the body is still the subject of investigation. The authors were led to believe that excretion was an important factor because they found that the urine of the animals contained depressor substance after strangulation had been produced. Furthermore after the injection of depressor substance into normal cats it was found that the urine gave a depressor reaction where as normal urine was pressor.

Preliminary investigations in three clinical cases of mild strangulation of short duration failed to reveal the presence of depressor substance in the peritoneal fluid. In five cases of intestinal strangulation however a few cubic centimeters of the patient's urine injected into animals gave the typical depressor reaction. Control injections of urine from normal persons cause no reaction or slight pressor reactions.

ARTHUR S. W. TOLKOFF, M.D.

Black, R. A. and Benjamin, E. L. Enterogenous Abnormalities, Cysts and Diverticula. *Am J Dis Child* 1936 51: 11-6.

The authors report a case of thoracic cyst and abdominal diverticulum of enterogenous origin.

The patient was a boy four and one half months old a third child. His grandmother had given birth to thirteen children, ten of whom died before the age of six months of "intestinal trouble."

The infant had been well until three weeks before his admission to the hospital. Up to that time he had been breast fed, but at the onset of the illness he developed a sore mouth and breast feeding was discontinued.

Ten days after the onset of the illness the patient began passing from three to six black, tarry stools daily, the abdomen became distended, and an increasing pallor was noted.

On X ray examination the cardiac shadow was found to be of normal size but considerably displaced to the right. A marked cloudiness of the entire left lung was noted, and atelectasis was suspected. Three weeks after the first roentgen examination a second was made. The cloudiness of the left lung still persisted but was less marked.

Thirty-two days after his admission to the hospital the child suddenly developed symptoms of shock. Melena and frequency of defecation recurred and death resulted seven hours later.

At autopsy, a retromediastinal cystic mass was found attached to the left anterolateral aspect of the third to twelfth thoracic vertebrae. The cyst projected into the left thoracic cavity, displacing the heart to the right and the left lung forward and down. It weighed 325 gm., was 14 cm long and had a maximum circumference of 20 cm. at its mid point. It contained 275 c cm. of a pseudomucinous, slightly turbid, pale yellow, thin fluid with a specific gravity of 1.012. On microscopic examination the cyst wall was found to be made up of the following layers from within outward: mucosa (?), muscularis mucosae, submucosa, circular muscle longitudinal muscle, and serosa.

In the abdomen, between the folds of the mesentery, an accessory intestinal pouch 10 cm long was found beside the jejunum, about midway between the pylorus and the ileocecal junction. This pouch had a good blood supply, and its mucosa resembled that of the bowel. There were two communications between the diverticulum and the bowel: one in the upper third and the other at the distal end of the pouch. Just above the upper communication with the bowel a perforation of the pouch was discovered. There was very little peritoneal reaction about the perforation. On histological examination the perforation was found to be similar to the perforation of a peptic ulcer.

The authors are of the opinion the two communications between the pouch and the bowel proved that the abnormality was not a Meckel diverticulum. They were able to find only one similar case in the literature.

The authors conclude that while the cyst and diverticulum may have originated from remnants of the vitelline duct, this theory does not fully explain the mesenteric location of the diverticulum.

EARL O. LATIMER, M.D.

La Ragione, A. Subcutaneous Rupture of the Jejunum Due to the Kick of a Horse (*Rottura sottocutanea del digiuno da calcio di cavallo*). *Arch ital di chir.*, 1936, 43, 115.

The author reports a case of traumatic rupture of the upper jejunum to demonstrate the successful results of early operation with primary closure of the abdomen in such cases. The patient, a man thirty three years old, was kicked by a horse, the blow falling obliquely from the left on the umbilical region. At operation, five hours after the injury, a small perforation was found on the free border of the intestine from 20 to 30 cm below the duodenojejunal flexure. There was no lesion of the mesentery. The intestine was closed with Lembert sutures, the peritoneum cleansed, and the abdominal wall closed. Recovery was uneventful. The mechanism of the trauma appears to have been a crushing of the intestine against the spine.

The author discusses the various mechanisms involved in rupture of the intestines, the differential diagnosis of intestinal perforation with particular reference to the behavior of the pulse, the necessity for operation as soon as the shock has passed off, and the question of primary closure of the abdomen.

The article is followed by a bibliography.

M. F. MORSE, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Royster, H. A., Haywood, H. B. and Stanfield, W. W. The Treatment of Amebic Abscess of the Liver. *Ann Surg.*, 1936, 103, 794.

The authors report in considerable detail a case of amebic abscess of the liver which was treated by multiple aspirations and the simultaneous injection of emetin intramuscularly and into the abscess cavity.

The patient was a man fifty two years of age who was admitted to the hospital with a two months history of pain in the lower anterior and posterior portions of the chest on the right side, swelling in the right upper quadrant of the abdomen, diarrhea, and blood in the stools. Examination revealed a friction rub over the right with interspace anteriorly and a tense swelling in the right upper quadrant of the abdomen. The liver was enlarged upward to the third rib and downward to a point 3 in. below the costal arch. The temperature was 103 degrees F and the leucocyte count 18,000. The protozoa of *Endameba histolytica* were found in the stools. X ray examination confirmed the clinical diagnosis of abscess of the liver.

The treatment consisted of multiple aspirations of the liver abscess through the midline and the simultaneous injection of emetin both intramuscularly and into the abscess cavity.

During his convalescence the patient developed pleurisy with effusion on the right side. Seven liver aspirations were performed. The patient was discharged completely well approximately six weeks after his admission to the hospital.

In discussing the literature the authors state that aspiration has been performed previously as a curative measure, and that emetin injected intramuscularly is a specific against the disease. They have given intramuscularly 1 gr. of emetin daily for ten days.

In the discussion of this report Ochsner stated that the diagnosis of abscess of the liver is greatly facilitated by x-ray examination. He stressed the importance of anteroposterior and lateral roentgenograms which show obliteration of the cardiophrenic angle and elevation of the medial portion of the right diaphragm. In subphrenic pyogenic infections, which are usually secondary to appendiceal infections, they show obliteration of the lower half of the diaphragm with obliteration of the costophrenic angle. In sixteen cases of abscess of the liver treated by transpleural drainage the mortality was 25 per cent. In fourteen treated by right rectus incision 21 per cent. In nine treated by incision through the retroperitoneal approach 11 per cent. and in twenty-four treated by aspiration and the administration of emetin 4 per cent. Ochsner emphasized the importance of great caution in the administration of emetin. He stated also that as most amebic abscesses are sterile open drainage is undesirable because of the danger of secondary infection which greatly increases the mortality.

JOHN H. GARLOCK, M.D.

MISCELLANEOUS

Du Bourguet: The Sequelae of Penetrating Wounds of the Abdomen. A Critical Study Based on a Review of the Reports on 606 Persons Wounded in the War of 1914 to 1918. (*Les sequelles des plaies penetrantes de l'abdomen. Etude critique sur l'examen de 606 observations de blesses de la guerre 1914-1918.*) *Rev. de chir.* 1930, 55, 175.

The lesions reviewed by the author were of the following types: lesions of the abdominal wall 287; peritoneal lesions 103; canalicular lesions (lesions of the intestines, biliary passages, etc.) 25; fistulas 82; lesions of solid organs (retained foreign bodies) 97; and miscellaneous 8. There were of course many overlapping lesions such as a serious loss of substance of the abdominal wall associated with intra-abdominal lesions of considerable extent. However, each case is included in only 1 group.

The 287 lesions of the abdominal wall included 144 abdominal hernias, 28 diaphragmatic hernias, 113 adherent scars, 4 other lesions, and 2 aneurysms. The abdominal hernias included 98 postoperative hernias, of which 64 were small, 19 of medium size, and 15 extensive; 27 large hernias with loss of substance, and 9 paralytic hernias. In the cases of small postoperative hernias the incidence of invalidism was about 10 per cent. in those of hernias of medium size it ranged from 10 to 65 per cent. and averaged about 30 per cent. and in those of large hernias it ranged from 50 to 65 per cent. In the 27 cases of hernia with loss of substance it ranged from 40 to

70 per cent. and in the 19 case of paralytic hernia from 10 to 40 per cent. The symptoms were due largely to displacement of organs and adhesions to the hernia or scar.

Small hernias can be controlled by the wearing of a truss or belt but for large hernias operation is desirable. The author describes briefly various operative measures for the cure of hernia—simple closure, overlapping procedures, and plastic repair. He states that, in general, the results of operation are good but many patients refuse operation preferring a truss and a pension. The procedure indicated for paralytic hernias consists in resecting the atrophied muscle zone and suturing the edges.

In cases of diaphragmatic hernia operation is necessary as a rule as traumatic hernia of this type is usually serious. Of the 28 cases reviewed operation was performed in 23, with death in 5 and cure in 18. Of the 5 patients not operated upon 2 were dead and 3 were living at the time of the report. The author discusses the diagnosis and operative treatment of traumatic diaphragmatic hernia.

Of the 113 patients with adherent scars 37 had only subjective symptoms. In general the incidence of invalidism in this group was rather low. Surgical treatment is not often indicated for adherent scars. It should consist of excision of the scar and resuture of the wall in layers.

The 103 cases of peritoneal complications were divided into 2 groups: (1) 68 of deep adhesions, and (2) 35 of peritonitis. In the first group the common symptom was pain often associated with difficulty in passage of the intestinal contents without actual obstruction. In the second group the complications were gastric distention, slow emptying of the stomach and duodenum visible and audible peristalsis, and vague and often rhythmic pains. The incidence of invalidism in this group ranged from 10 to 45 per cent. but averaged 25 per cent. As a rule surgical treatment is indicated. It should consist of freeing of the adhesions or short circuiting.

Of the 25 cases of canalicular lesions intestinal stenosis occurred in 24 and stenosis of the biliary tract in 1. Because of the frequency of multiple adhesions direct approach to the lesion is rarely possible and short circuiting is necessary. In the case of biliary obstruction cholecystogastrostomy was done.

Of the 86 fistulas 5 were biliary, 37 urinary, and 44 fecal. In cases of biliary fistula there is a tendency toward spontaneous cure. If spontaneous cure does not occur operative intervention—either plastic restoration of the ducts or short circuiting—is necessary. Of the 37 urinary fistulas 31 were vesical and 6 vesicorectal. The vesical fistulas were usually of the intermittent type with periods of drainage. Operation was seldom indicated for such fistulas except for the removal of foreign bodies. For the closure of vesicorectal fistulas multiple operations are usually necessary. Of the 44 fecal fistulas about half healed spontaneously. The rest

The patient was a boy four and one half months old a third child. His grandmother had given birth to thirteen children, ten of whom died before the age of six months of "intestinal trouble."

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Thirty two days after his admission to the hospital the child suddenly developed symptoms of shock. Melena and frequency of defecation recurred and death resulted seven hours later.

At autopsy, a retromediastinal cystic mass was found attached to the left anterolateral aspect of the third to twelfth thoracic vertebrae. The cyst projected into the left thoracic cavity, displacing the heart to the right and the left lung forward and down. It weighed 325 gm., was 14 cm. long, and had a maximum circumference of 20 cm. at its mid point. It contained 275 c cm. of a pseudomucinous, slightly turbid, pale yellow, thin fluid with a specific gravity of 1.012. On microscopic examination the cyst wall was found to be made up of the following layers from within outward: mucosa (?), muscularis mucosae, submucosa, circular muscle, longitudinal muscle, and serosa.

In the abdomen, between the folds of the mesentery, an accessory intestinal pouch 10 cm. long was found beside the jejunum, about midway between the pylorus and the ileocecal junction. This pouch had a good blood supply, and its mucosa resembled that of the bowel. There were two communications between the diverticulum and the bowel, one in the upper third and the other at the distal end of the pouch. Just above the upper communication with the bowel a perforation of the pouch was discovered. There was very little peritoneal reaction about the perforation. On histological examination the perforation was found to be similar to the perforation of a peptic ulcer.

The authors are of the opinion the two communications between the pouch and the bowel proved that the abnormality was not a Meckel diverticulum. They were able to find only one similar case in the literature.

The authors conclude that while the cyst and diverticulum may have originated from remnants of the vitelline duct, this theory does not fully explain the mesenteric location of the diverticulum.

LARL O. LATIMER, M.D.

Ia Ragione, A. Subcutaneous Rupture of the Jejunum Due to the Kick of a Horse (*Rottura sottocutanea del digiuno da calcio di cavallo*). *Arch Ital di chir.*, 1936, 43, 115.

The author reports a case of traumatic rupture of the upper jejunum to demonstrate the successful results of early operation with primary closure of the abdomen in such cases. The patient, a man thirty three years old, was kicked by a horse, the blow falling obliquely from the left on the umbilical region. At operation, five hours after the injury, a small perforation was found on the free border of the intestine from 20 to 30 cm. below the duodeno-jejunal flexure. There was no lesion of the mesentery. The intestine was closed with Lembert sutures, the peritoneum cleansed, and the abdominal wall closed. Recovery was uneventful. The mechanism of the trauma appears to have been a crushing of the intestine against the spine.

The author discusses the various mechanisms involved in rupture of the intestines, the differential diagnosis of intestinal perforation, with particular reference to the behavior of the pulse, the necessity for operation as soon as the shock has passed off, and the question of primary closure of the abdomen.

The article is followed by a bibliography.

M. F. MORSE, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Royster, H. A., Haywood, H. B. and Stanfield, W. W. The Treatment of Amebic Abscess of the Liver. *Ann Surg.*, 1936, 103, 794.

The authors report in considerable detail a case of amebic abscess of the liver which was treated by multiple aspirations and the simultaneous injection of emetin intramuscularly and into the abscess cavity.

The patient was a man fifty two years of age who was admitted to the hospital with a two months history of pain in the lower anterior and posterior portions of the chest on the right side, swelling in the right upper quadrant of the abdomen, diarrhea, and blood in the stools. Examination revealed a friction rub over the right sixth interspace anteriorly and a tense swelling in the right upper quadrant of the abdomen. The liver was enlarged upward to the third rib and downward to a point 3 in. below the costal arch. The temperature was 103 degrees F. and the leucocyte count 18,000. The protozoa of *Endameba histolytica* were found in the stools. X-ray examination confirmed the clinical diagnosis of abscess of the liver.

The treatment consisted of multiple aspirations of the liver abscess through the midline and the simultaneous injection of emetin both intramuscularly and into the abscess cavity.

During his convalescence the patient developed pleurisy with effusion on the right side. Seven liver aspirations were performed. The patient was discharged completely well approximately six weeks after his admission to the hospital.

In discussing the literature the authors state that aspiration has been performed previously as a curative measure, and that emetin injected intramuscularly is a specific against the disease. They have given intramuscularly 1 gr of emetin daily for ten days.

In the discussion of this report OCHSNER stated that the diagnosis of abscess of the liver is greatly facilitated by x-ray examination. He stressed the importance of anteroposterior and lateral roentgenograms which show obliteration of the cardiophrenic angle and elevation of the medial portion of the right diaphragm. In subphrenic pyogenic infections which are usually secondary to appendiceal infections they show obliteration of the lower half of the diaphragm with obliteration of the costophrenic angle. In sixteen cases of abscess of the liver treated by transpleural drainage, the mortality was 25 per cent; in fourteen treated by right rectus incision 27 per cent; in nine treated by incision through the retroperitoneal approach, 11 per cent; and in twenty-four treated by aspiration and the administration of emetin 4 per cent. Ochsner emphasized the importance of great caution in the administration of emetin. He stated also that as most amebic abscesses are sterile open drainage is undesirable because of the danger of secondary infection which greatly increases the mortality.

JOHN H. GARLOCK, M.D.

MISCELLANEOUS

Du Bourguet. The Sequelæ of Penetrating Wounds of the Abdomen. A Critical Study Based on a Review of the Reports on 606 Persons Wounded in the War of 1914 to 1918. (*Les sequelles des plaies pénétrantes de l'abdomen. Étude critique sur l'examen de 606 observations de blessés de la guerre 1914-1918.*) *Revue de chirurgie* 1936 55 1,5.

The lesions reviewed by the author were of the following types: lesions of the abdominal wall 287; peritoneal lesions 103; canalicular lesions (lesions of the intestines, biliary passages, etc.) 25; fistulas 82; lesions of solid organs (retained foreign bodies) 97; and late abscesses 8. There were of course many overlapping lesions such as a serious loss of substance of the abdominal wall associated with intra-abdominal lesions of considerable extent. However, each case is included in only 1 group.

The 287 lesions of the abdominal wall included 144 abdominal hernias, 28 diaphragmatic hernias, 113 adherent scars, 4 other lesions, and 2 aneurisms. The abdominal hernias included 98 postoperative hernias of which 64 were small, 19 of medium size, and 15 extensive; 27 large hernias with loss of substance and 9 paralytic hernias. In the cases of small postoperative hernias, the incidence of invalidism was about 10 per cent; in those of hernias of medium size it ranged from 10 to 65 per cent and averaged about 30 per cent; and in those of large hernias it ranged from 50 to 65 per cent. In the 27 cases of hernia with loss of substance it ranged from 40 to

70 per cent, and in the 19 cases of paralytic hernia from 10 to 40 per cent. The symptoms were due largely to displacement of organs and adhesions to the hernia or scar.

Small hernias can be controlled by the wearing of a truss or belt but for large hernias operation is desirable. The author describes briefly various operative measures for the cure of hernia—simple closure, overlapping procedures, and plastic repair. He states that, in general, the results of operation are good but many patients refuse operation preferring a truss and a pension. The procedure indicated for paralytic hernias consists in resecting the atrophied muscle zone and suturing the edges.

In cases of diaphragmatic hernia operation is necessary as a rule as traumatic hernia of this type is usually serious. Of the 28 cases reviewed, operation was performed in 23, with death in 5 and cure in 18. Of the 5 patients not operated upon, 2 were dead and 3 were living at the time of the report. The author discusses the diagnosis and operative treatment of traumatic diaphragmatic hernia.

Of the 113 patients with adherent scars, 37 had only subjective symptoms. In general the incidence of invalidism in this group was rather low. Surgical treatment is not often indicated for adherent scars. It should consist of excision of the scar and resuture of the wall in layers.

The 103 cases of peritoneal complications were divided into 2 groups: (1) 68 of deep adhesions, and (2) 35 of perivisceritis. In the first group the common symptom was pain often associated with difficulty in passage of the intestinal contents without actual obstruction. In the second group the complications were gastric distention, slow emptying of the stomach and duodenum, visible and audible peristalsis and vague and often rhythmic pains. The incidence of invalidism in this group ranged from 10 to 45 per cent, but averaged 25 per cent. As a rule surgical treatment is indicated. It should consist of freeing of the adhesions or short circuiting.

Of the 25 cases of canalicular lesions, intestinal stenosis occurred in 24 and stenosis of the biliary tract in 1. Because of the frequency of multiple adhesions direct approach to the lesion is rarely possible and short circuiting is necessary. In the case of biliary obstruction cholecystogastrostomy was done.

Of the 86 fistulas, 5 were biliary, 37, urinary, and 44 fecal. In cases of biliary fistula there is a tendency toward spontaneous cure. If spontaneous cure does not occur operative intervention—either plastic restoration of the ducts or short circuiting—is necessary. Of the 37 urinary fistulas, 31 were vesical and 6 vesicorectal. The vesical fistulas were usually of the intermittent type with periods of drainage. Operation was seldom indicated for such fistulas except for the removal of foreign bodies. For the closure of vesicorectal fistulas, multiple operations are usually necessary. Of the 44 fecal fistulas, about half healed spontaneously. The rest

required surgical closure. The author reviews the various methods of closing fecal fistulas.

Of the 97 lesions involving solid structures and due largely to retained foreign bodies, 3 involved the abdominal wall, 2, a kidney, 1, the spleen, 1, the peritoneum, 5, the omentum, and 60, the liver. Operative removal of the foreign body is often indicated for such lesions.

In conclusion the author calls attention to the fact that penetrating wounds of the abdominal wall are generally more persistent and important than intra-abdominal lesions. The former tend to become worse, while the latter tend to become cured spontaneously. Most of the late sequelæ are fairly amenable to surgical treatment.

MAX M. ZINNINGER, M.D.

Oberhelman, H. A., and LeCount, E. R. *Peace-Time Bullet Wounds of the Abdomen*. *Arch Surg*, 1936, 32: 373.

The authors review the results obtained in 343 cases of bullet wounds of the abdomen treated at the Cook County Hospital, Chicago, during the period from 1911 to 1924, and trace the development of the treatment of such wounds from 1525 up to the present time. From the literature they collected 494 cases in which laparotomy was performed. Of these, 780 (52.6 per cent) terminated fatally.

In the Cook County Hospital series of cases the wounds were such as are usually produced by homicidal, suicidal, and accidental shootings in large cities. None of them was due to the kind of machine guns now used by gangsters. Only 1 was produced by a shotgun. Of the 222 patients who died, laparotomy was performed on 169 and 205 came to autopsy. Of the 37 patients who died without operation, 33 were either moribund or in poor condition when they entered the hospital.

The largest group of cases with wounds involving a single abdominal organ were 41 cases of injuries of the small intestine. Of the 301 cases in which laparotomy was performed, injury of 2 or more viscera was found in 182. The mortality in the latter group was 80.7 per cent. Forty-three patients had wounds of both the abdomen and the thorax. Of the 31 of this group who were operated upon, 24 died, whereas of the 12 who were not operated upon, all died. Of the 169 patients coming to autopsy after laparotomy, overlooked wounds were found in 94. As undoubtedly there were overlooked wounds in some of the cases in which recovery resulted, the incidence of overlooked wounds in the entire series is not known.

The authors' study indicates that when death occurs within twenty-four hours after a bullet injury, it is due to hemorrhage and shock, whereas when it occurs later it is usually due to generalized peritonitis.

EARL GARSIDE, M.D.

GYNECOLOGY

UTERUS

Hamant A and Durand, E. Hysteroscopy, Its Technique and Results (*L'hystérocopie sa technique ses résultats*) *Rev franç de gynec et d obst* 1930 35 1

In recent years hysteroscopy has again aroused the interest of investigators with the result that this method of visualizing the uterine cavity has been perfected to a point where it gives promise, after still greater improvements have been made of becoming a most important diagnostic procedure for every gynecologist. The authors describe the hysteroscope devised by Segond and the technique of its use by them in the study of the endometrium.

After antiseptic preparation of the vulva and vagina and dilatation of the cervix with Hegar bougies under local or general anaesthesia the hysteroscope is introduced into the uterus and the uterine cavity irrigated with sterile water until the return flow is entirely colorless. The optical attachment is then inserted and to make visual inspection possible the uterine cavity is distended with sterile water. To prevent the water from flowing back through the cervix care is taken to limit the preliminary dilatation of the cervix to that which will hold the hysteroscope tube in tight approximation with the cervical canal. The amount of pressure necessary to distend the uterine cavity (650 mm water or from 25 to 30 mm Hg) is not great enough to cause the water to flow through the tubes into the peritoneal cavity. In none of the authors' cases has the water passed through the tubes during hysteroscopy.

Hysteroscopy is contra indicated in fixed retro displacements of the uterus, pregnancy, peruterine inflammations and profuse metrorrhagia.

The chief difficulty in hysteroscopy is not the technique but the interpretation of the images. The authors present twenty two illustrations in color to show their findings in normal and pathological conditions. For the removal of sections of endometrium for microscopic examination they use a special biopsy attachment. In their studies of removed uteri they have compared the findings of hysteroscopy with the macroscopic appearance of the opened uterine cavity. They believe that catheterization of the fallopian tubes and direct treatment of intra uterine lesions will be possible when suitable instruments are devised.

HAROLD C MACK M D

Berutti E. Structural Changes of the Uterine Arteries Related to Age (*Modificazioni strutturali dell'arteria uterina in rapporto all'età*) *Ginecologia* 1936 2 421

The author studied the uterine arteries of eighteen subjects ranging in age from sixteen to eighty five

years. Seventeen of the specimens were obtained at autopsy from thirty to forty eight hours after death. One was an operative specimen. Sections were taken from the vicinity of the crossing of the ureter and artery and also at a distance of 2 or 3 cm from the origin of the uterine artery from the hypogastric artery. The elastic tissue was stained by the Weigert method and the fat with Sudan III. For the collagen and muscular tissue hematoxylin eosin and the Mallory stain were used.

It was found that with advancing age there occurred a hyperplasia of the musculo elastica of the intima and an increase in the muscular component of the adventitia. The specimens from women who had passed the menopause showed a hyperplasia of the subendothelial elastic connective tissue of the intima which almost produced complete obliteration of the artery. Atrophy of the muscular and elastic tissue of the media and an increase in the size of the vasa vasorum.

CARLOS S SCUDERI M D

Jeanneney G and Magendie J. Cardiac Disturbances in Cases of Fibroma (*Troubles cardiaques dans les fibromes*) *Gynec et obst* 1936 33 377

This article is based on the reports of von Jaschke, Arkansky, Taccani and others on cardiac disturbances associated with uterine fibromas and 46 cases of such disturbances which have come under the authors' observation. Of the latter dyspnea occurred in 31 (67.4 per cent), palpitation in 32 (69.5 per cent), and vertigo in 23 (50 per cent). Of 354 cases reported by von Jaschke, physical cardiac signs, including dullness of the heart sounds, doubling of the second bellows sound, and slight rhythmic disturbances occurred in 90. Cardiac dilatation is common with fatty degeneration, hypertrophy with arteriosclerosis and brown atrophy of the heart. In 20 per cent of von Jaschke's cases there was secondary anemia of the heart. This was probably due to a sort of hypostole caused by repeated or abundant hemorrhage. In all of the cases orthotelerontgenography revealed an ectasia especially of the right heart. The electrocardiogram showed a general flattening of the curve due to diminution of amplitude. The most common peripheral signs and symptoms are vasomotor disturbances, edema and headache. Of the authors' cases, vasomotor disturbances occurred in 63 per cent, edema in 25 per cent, and headache in 23 per cent. In cases of fibroma there is usually a generalized spasm of the capillaries producing a pallor without true anemia. Hypertension is present in more than half of the cases. There may be also a decrease in the hemoglobin and a slight decrease in the number of erythrocytes with a slight hypo

leucocytosis and a tendency toward lymphocytosis and mononucleosis

Not infrequently there are associated valvular lesions, especially mitral insufficiency from Basedow's disease. Sudden death in cases of fibroma has been reported occasionally. In cases of fibroma with associated cardiac involvement the postoperative mortality is 11.5 per cent whereas in cases of fibroma without cardiac involvement it is 3.5 per cent.

According to Winter, the cardiac changes associated with fibroma have been classified by Taccani as follows:

1. Endocarditic valvular changes probably due to secondary infection of the tumor

2. Changes of the myocardium, lipomatosis, myofibrosis, brown atrophy, and fatty degeneration, especially in association with the menopause, malnutrition, or secondary hemorrhagic anemia

3. Dilatation of the cardiac cavities with or without hypertrophy of the walls, due particularly to hemorrhagic anemia

4. Functional disturbances without demonstrable changes in the heart

The reported incidence of cardiac disturbances in women with fibromas varies from 1.50 to 47 per cent. The average incidence is probably between 25 and 30 per cent. Of 196 cases of fibroma, the authors found cardiac disturbances in 46 (24 per cent).

By some, the cardiac complications are attributed to the action of a toxin liberated by the tumor. However, the existence of such a toxin has never been proved. By others, the complications have been ascribed to a relationship between the fibroma and endocrine glands, particularly the thyroid and ovaries. This theory is supported by the spastic state of the capillaries, which suggests a sympathetic disturbance of endocrine origin, by the fact that fibromas are found very frequently in women with thyroid lesions, by the marked improvement in exophthalmic goiter which has been known to follow hysterectomy or utero-ovarian radiotherapy, and by the diminution in the hemorrhage caused by the fibromas which sometimes occurs after irradiation of the thyroid. Since it has been shown that anemia may cause cardiac disturbances, many believe that the cardiac complications are a result of the anemia secondary to the hemorrhage occurring in cases of fibroma. While anemia must play some part in the development of the cardiac disturbances occurring in cases of fibroma with hemorrhage, cardiac trouble seems more common in cases of fibroma with little or no hemorrhage. However, there is no doubt an anemia due to infection. Hypertension is found in about 55 per cent of women with fibromas, whereas in women of the same age without fibromas its incidence is between 10 and 15 per cent. This seems coincidental rather than of etiological importance. Several of these causes may co-operate to produce the cardiac complications. Instead of a contraindication, the latter are an

indication for immediate removal of the fibroma. The operation should be preceded by a blood transfusion.
EDITH SCHANCHE MOORE

Scheffey, L. C., and Thudium, W. J. Further End-Results in the Treatment of Carcinoma of the Cervix. *Am J Obst & Gynec*, 1936, 31, 946

The authors present an analysis of 156 cases of carcinoma of the cervix observed on the gynecological ward service of the hospital of the Jefferson Medical College, Philadelphia, in the period from 1921 to 1930. One hundred and forty-six were treated. The discussion of the end results is based on 96.1 per cent of the cases seen and 97.9 per cent of those treated. The incidence of absolute curability was 19.2 per cent, that of relative curability, 20.5 per cent, and that of five year survival, 25.3 per cent. In 63 cases observed in the period between 1921 and 1925 the corresponding percentages were 14.2, 15.0, and 20.7. The authors attribute the improvement to (1) increased milligram hours of radium irradiation with the eventual attainment of an average dose of 3,600, (2) improvement in the technique of application of the radium as the result of experience, and (3) improvement in the management of the follow up clinic under the personal supervision of those treating the patients.

EDWARD L. CORNELL, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Schiller, W. The Question of the Specificity of Masculinizing Ovarian Tumors (Zur Frage der Spezifität vermaennlichender Ovarialtumoren). *Arch f Gynok*, 1935, 160, 344

The question of whether masculinizing ovarian tumors constitute a well characterized and definite group or whether there are various types of ovarian tumors which have the same masculinizing effect is of importance, for if the second hypothesis is true, it would be proof that the action of the sex hormone is non specific, a theory defended especially by Halban. The literature reports cases in which masculinization was caused by tumors to which no hormonal action has been attributed, as, for example, fibromas and teratomas. On the other hand, there have been observations of masculinization caused by tumors which produce a definitely female hormone such as lutein and by granulosa cell tumors.

To arrive at an explanation of the involved relationship it is necessary, first of all, to determine whether the tumors in the cases under consideration belong to the group of neoplasms causing masculinization solely by biological action. A sharp distinction must be made between defeminization and masculinization. For instance, atrophy of the breasts demonstrates only defeminization and not masculinization, and amenorrhea is a quite unspecific sign which results also from overproduction of the female sex hormone. The establishment of masculinization is dependent upon three signs: marked growth of hair on the face and body, deepening of the voice, and hypertrophy of the clitoris. True masculiniza-

tion can be claimed only if at least two of these three signs are observed. An etiological relationship between masculinization and a tumor can be considered proved only if the signs of masculinization disappear after extirpation of the tumor. If the cases in question are classified according to this strict viewpoint, only three characteristic, well defined groups of masculinizing ovarian tumors remain—the adrenal tumors, the so called arrhenoblastomas, and the lutein tumors.

The fact that adrenal tumors have a masculinizing effect is not very surprising as the picture of interrenalism, i. e. masculinization of females by adrenal tumors, has been well known since the observations of Ogston, De Crecchio, Marchand and Gallais. As feminizing adrenal tumors have been found in males (cases reported by Holl, Brutschy, and others), the theory of Bauer that adrenal tumors exert a protective influence on rests of histosexual anlagen and in this way may masculinize women and feminize men has been accepted. It must be emphasized that not every adrenal tumor produces such an effect, the explanation being probably that rests of histosexual anlagen do not exist in every person. Only when such rests remain can such a change be produced by an adrenal tumor. The theory of Krabbe that there are masculine and feminine adrenal tissues, i. e. that the adrenal is differentiated sexually, is quite generally rejected today.

The second group of masculinizing ovarian tumors, the arrhenoblastomas, are easily explained if their very varied and different histological pictures are compared with the histological picture of the fetal testicle. The arrhenoblastomas arise from masculinely differentiated mesenchymal cells of the ovary. These cells develop in the same way as the fetal testicle but without spermatogonia. The earliest stage suggests a cellular fibroma. In the next stage there appear trabeculae corresponding to the embryonic cords but without spermatogonia. Up to this point as in the beginning stage of the gonads themselves a distinction between a masculinizing tumor, an arrhenoblastoma and a feminizing or granulosa cell tumor is impossible. However, when the development has proceeded somewhat further a distinct differentiation becomes manifest. In granulosa cell tumors the trabeculae are several cell layers thick, the cells are round, and there is no tendency toward lumen formation. In arrhenoblastomas the trabeculae are thin, consisting of only two cell layers, the cells are high cylindrical, with their long axes normally in the direction of the axis of the trabeculae, and with advancing development a lumen appears between the two cell layers.

Another characteristic of the arrhenoblastoma is the formation of fat laden cells similar to the Leydig cells of the testicle, in the connective tissue between the large trabeculae. The canalicular form which has been described by Pick as "testicular adenoma," represents the biggest stage of the development. When an adenoma of this type (which has the great

est similarity to the testicle of all ovarian tumors) does not exert a masculinizing effect, the tumor tissue resembles, not the canalicular substance of the testicle but the testicular rete, which possesses no hormonal action.

The third and last group of masculinizing ovarian tumors are the so called lutein tumors. These exhibit an especially strong activity, but are represented in the literature by only three cases (Schultze, Ringel, Cosaccesco et al., and Selheim). It has been proved that the tissue of these tumors represents neither luteinized granulosa cells nor luteinized theca cells. The microscopic picture indicates rather that they are true adrenal tumors, thereby explaining their action. This refutes one proof of a non specific action of the sex hormones—the theory that tumors which produce lutein, a female hormone may exert a masculinizing effect. In the literature there are reported also a number of cases of masculinizing granulosa cell tumors. However, further study of these cases revealed that not a true masculinization but only a degenerative hypertrichosis and similar changes had occurred or that the neoplasms were mixed tumors, being partly arrhenoblastomas and partly granulosa cell tumors. As cases of histologically characteristic arrhenoblastomas without masculinizing effect have also been observed, it must be assumed that the masculinizing effect of arrhenoblastomas, as well as that of adrenal tumors, becomes evident only when anlagen for masculinization are present. Such anlagen are not present in all women. DAVIES, G. MOATON, M.D.

Baldwin L. G. and Gafford J. A., Jr. Arrhenoblastoma. Case Report. Endocrinology 1936, 20 373

The authors report the clinical, laboratory, roentgenological, gross and microscopic findings in a case of an arrhenoblastoma in a twenty four year-old negroess who presented typical masculine changes. Removal of the ovarian tumor was followed by the gradual return of feminine characteristics. Four and one half months later another laparotomy was done for the removal of a uterine fibroma.

A brief discussion of Meyer's classification of arrhenoblastomas into three groups is given. In the first group Meyer places the adenoma tubulare testiculare, which includes mature forms and partially carcinomatous forms, in the second group tumors with typical and atypical tubular as well as solid portions and in the third group atypical tumors some of which are mostly solid but show atypical tubular portions and others of which are completely solid. The majority of patients with tumors of the first group do not show masculinization or defeminization. Those with tumors of the third group show pronounced masculine changes and those with tumors of the second group show less marked changes of this type.

The typical history in cases of the third group, the group to which the authors' case belonged is as follows:

The individual has matured normally and enjoyed several years of a normal feminine existence. Signs of defeminization and masculinization then begin. These include loss of the normal feminine curves, atrophy of the breasts, loss of the head hair, male distribution of the pubic hair, the growth of a beard, growth of the clitoris, the development of a baritone voice, and profuse menses followed by amenorrhea. The patient is normal sexually and has no decrease of libido. Medical aid is sought because of the amenorrhea or because a tumor is suspected.

It seems certain that the tumor is responsible for these changes for after its removal the patient becomes normal except for the male voice and the enlargement of the clitoris.

These tumors resemble sarcomas but are relatively benign. Hence it is safe to conserve the uterus and the other ovary. The cause of the associated amenorrhea is unknown. Probably the male hormone reacts with anterior pituitary hormones, either directly or indirectly, to make them inactive so far as the ovarian changes are concerned.

From an extensive search of the literature the authors conclude that theirs is probably the thirty-third case to be reported. They present a tabulation of all of the cases recorded, classified according to the classification of Meyer.

HERBERT F. THURSTON, M.D.

MISCELLANEOUS

Nizza, M. Observations on the Influence of Athletics on Menstrual Function (Osservazioni sull'influenza dello sport atletico sulla funzione mestruale) *Ginecologia*, 1936, 2: 153.

After briefly reviewing the literature on the influence of athletics on menstrual function, Nizza reports the results of a study of fifty girls who were actively participating in light athletics such as jumping, running, basket ball, swimming, canoeing, skiing, and tennis.

The girls ranged in age between seventeen and twenty-two years. The youngest was fifteen and

the oldest twenty-four. The author divides them into two groups on the basis of their training.

In the first group there were thirty girls who had been training four or five hours a week for not more than a year. Among these were ten girls who abstained from training during the menses. None of the latter experienced disturbances of menstruation. One even stated that athletics relieved the dysmenorrhea and hypermenorrhea of which she had been suffering since puberty. The remaining twenty girls in the first group participated in athletic training also during the menses. Of these, nine had no complaints, eight complained of an increased sense of fatigue when training during menstruation, and three stated that during the period their vigor was increased. However, one of the latter stated that during menstruation she experienced an increased sense of fatigue the day following training and that she had been repeatedly amenorrheic.

In the second group were twenty girls who had been training for from seven to ten hours a week over a period of several years. Among them were girls who had participated in various Olympic contests. Training was continued even during the menses. Eleven girls did not notice any disturbances, but nine stated that they experienced a greater sense of fatigue when training during menstrual periods. Of the latter, five complained of pain in the lower quadrants of the abdomen during menstruation, and two of menorrhagia, headaches, dizziness, and nausea. Five of the girls in the second group developed various disturbances of menstrual function such as menorrhagia, early monthly onset, and prolonged flow during their athletic career.

The author concludes that girls indulging in athletic activities during menstruation are apt to develop disturbances of this function because the pelvic congestion which occurs at the menstrual periods tends to become aggravated by increased muscular activity. He therefore suggests that activity requiring excessive muscular work be completely avoided during menstruation.

RICHARD E. SOMMA

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Kanter A E, Bauer, G P and Klawans A H
Hormonal Studies with the Ovipositor Lengthening Reaction of the Japanese Bitterling
Am J Obst & Gynec, 1936 17 764

The test for estrogenic hormone in which the ovipositor lengthening function of the Japanese bitterling is used as the criterion has proved of value in the detection of excesses of the hormone in the urine in cases of pregnancy, endocrine disturbances and chronic cystic mastitis. The results are most consistent and the incidence of error and misinterpretation is reduced to the minimum when only previously standardized fish are used.

As biological observations tend to show that the excess of gonadotropic hormone associated with pregnancy appears earlier than the estrogenic principles the authors do not advocate substitution of this test for the Aschheim Zondek or Friedman test for the diagnosis of early pregnancy. In two cases which they report the Friedman test was positive and the fish test negative and in two the fish test was positive and the Friedman test negative. Only preparations containing estrogenic substance influence ovipositor lengthening. The urine of pregnant women, non pregnant women at certain stages of the menstrual cycle, women with cystic mastitis and sexually active males and extracts of certain tumors give positive tests. The activating hormone is heat stable and apparently ether soluble.

EDWARD L CORNELL, M D

Crew F A E. Notes from a Pregnancy Diagnosis Laboratory (1935) *Brit M J* 1936 1 993

Combined Friedman and Aschheim Zondek tests gave correct positive results in the case of specimens taken fifteen days after the known date of intercourse and correct results also in the case of specimens which came by air mail from Kenya, Malta and Spain. Medico-legal problems were presented in six cases in which there was mental deficiency, three cases of criminal abortion, one case of rape and one case in which the possibility of pregnancy complicated divorce proceedings.

In one case in which a final diagnosis of carcinoma of the ovary was returned the Aschheim Zondek test was definitely negative. In a case in which, following operation, the condition found was recorded as an enormous ovarian cyst the Aschheim Zondek reaction was positive. In the case of a thirteen year old girl with a negative Aschheim Zondek reaction the uterus was as large as a three months pregnancy because of an imperforate hymen. A combined Friedman and Aschheim Zondek test gave a positive reaction in a case in which it was stated that ade-

quate contraceptive measures had been used. In the case of a woman who believed herself pregnant although both tubes had been cut and tied the reaction was definitely positive and the presence of pregnancy was demonstrated also by curettage.

In a case in which the Aschheim Zondek reaction was positive the pregnant woman was suffering from fragilis osseum. Her mother was crippled by the same condition and her child, aged three and one half years had had several fractures. This child had been delivered by cesarean section.

The records which include the time of intercourse in relation to the last menstrual period indicate quite clearly that conception can occur at any time during the intermenstrual period.

J THORNWELL WITHERSPOON, M D

Berutti E. The Permeability of the Placenta to Barbiturates (Sulla permeabilità placentare ai barbiturici). *Ginecologia*, 1936 2 497

The author studied the permeability of the placenta to veronal dial, luminal, somnifene evipan, and pemocton.

He found that the placenta is permeable to all of these preparations not only from the mother to the fetus but also from the fetus to the mother. It was most permeable to luminal and least permeable to evipan. Continued small daily doses caused abortion if the pregnancy was advanced or resorption of the embryo if it was in the early stages.

The studies were made on rabbits. The colorimetric method of Kappany, Murphy, and Krop was used for the quantitative determinations. The technique is described in detail.

The barbiturates were found to pass from the mother to the fetus in from fifteen minutes to one hour depending upon the preparation used.

By repeated hysterotomies, Berutti was able to determine the barbiturate concentration of the blood of the mother, the placenta and the fetus at intervals of three, five, and twelve hours. The concentration in the blood of the mother rapidly decreased from the beginning. In the placenta, the maximum concentration was reached at the end of three hours, and in the fetus at the end of five hours. After thirty six hours no barbiturates could be found in either the blood of the mother, the placenta, or the fetus.

CARLOS S SCUDERI, M D

Vayssière E, Mosinger E and Donnet V. The Diagnosis of Sex in Utero. The Method of Dorn and Sugarman (A propos du diagnostic du sexe in utero—méthode de Dorn et Sugarman). *Bull Soc d'obst et de gynec de Par* 1936 25 326

In an article which appeared in the *Journal of the American Medical Association* November 22 1937

Dorn and Sugarman described a biological test which they claimed made it possible to differentiate between male and female fetuses *in utero*. They stated that injection of the urine of women pregnant five months into male rabbits about three months of age, whose testicles are in the inguinal canal, causes changes which vary according to the sex of the fetus. When the urine is from a woman carrying a female fetus it causes characteristic changes in the testicles of the male rabbit after forty eight hours. The changes are (1) a vascular congestion which is visible macroscopically, and (2) stimulation of spermatogenesis with the production of spermatozoa and spermatoocytes but no spermatis. The urine of a woman carrying a male fetus does not produce these changes.

The authors describe experiments which they carried out to test the conclusions of Dorn and Sugarman. They found that the vasodilatation produced by the urine of women carrying female fetuses occurred also in animals injected with the urine of women carrying male fetuses and even in control animals. Spermatogenesis was more advanced in the control animals than in the injected animals. They state that it is necessary in such studies to examine a control testicle. In one case the testicle of a rabbit injected with the urine of a woman carrying a female fetus presented an appearance very similar to that described by Dorn and Sugarman, but the testicle of a control animal of the same litter showed practically the same picture. The authors therefore conclude that the test described by Dorn and Sugarman is not reliable for differentiation between the sexes *in utero*.

AUDREY GISS MORGAN, M D

LABOR AND ITS COMPLICATIONS

Rosenius, C. Some Statistical Tables of Parturition with Internal Podalic Version and Extraction. *Acta Soc med Fennica Duodecim* 1935 Ser B, Vol 23

In 258 cases in which internal podalic version and extraction of the fetus was done the infant mortality was 45.7 per cent and injury to the child was frequent. The high mortality and morbidity were due chiefly to the serious indications for the procedure, but also to narrow pelvis and rigidity of the tissues which increased the difficulty of delivery.

Version and extraction was done much more frequently in the cases of multiparas than in those of primiparas, and more often in the cases of old mothers than in those of young mothers. On the other hand, the infant mortality was considerably higher in the cases of primiparas than in those of multiparas. The incidence of premature rupture of the membranes was 16.5 per cent. The infant mortality in cases of premature rupture of the membranes was higher than in other cases.

Version with the whole hand and immediate extraction was the most common procedure. The infant mortality was decidedly lower when this method was used than when version and extraction of other

types was employed. The infant mortality was highest in the cases in which version and extraction was done on account of placenta previa or eclampsia.

J THORNWELL WITHERSPOOV, M D

Santomauro, U. The Infant Mortality in Podalic Delivery (*Natimortalità nel parto podalico*). *Ginecologia*, 1936, 2 323

The author presents statistics on podalic delivery from the clinic in Palermo for the period from 1929 up to the present time. In this clinic, as in most Italian clinics, the majority of the patients are admitted because of some pathological condition or complication of labor. This accounts for the relatively high mortality and number of operative deliveries.

A review of the statistics from several other clinics reveals an infant mortality varying from 9.78 to 44 per cent. The principal difference between cephalic and podalic delivery is in the hardness and maximum width of the presenting part. In podalic presentation a harmful effect is exerted on the fetus because a strong uterine force is required to push the presenting part forward, there is a marked distention of the inferior segment of the uterus, and labor is prolonged. The prolongation of labor favors the occurrence of fetal asphyxia.

Of the 4,000 deliveries at the Palermo clinic, 253 (6.32 per cent) were podalic. In 134, the podalic presentation was complete and in 119 incomplete. The infant mortality, including stillbirths, deaths occurring during labor, and those occurring during the first five days of life was 28.06 per cent. Exclusive of the 26 deaths due to causes independent of labor, it was 17.7 per cent. Santomauro classifies the deaths according to the variety of presentation and the weight of the fetus. The mortality was higher in operative than in spontaneous deliveries.

The author concludes that in the cases of multiparas and young primiparas the fetus in podalic presentation may be expected to deliver normally and spontaneously if it is small or of normal size. In the cases of primiparas a long episiotomy has been found of aid. After complete dilatation and when it is reasonably certain that the time of expulsion has arrived, the administration of a little pituitrin may be justified.

Disproportion between the fetus and mother, especially in the cases of primiparas from thirty three to thirty-eight years of age, is an indication for cesarean section because of the frequency of complications. The author considers this condition in some detail and stresses the value of x ray study.

A LOUIS ROSE, M D

Olbrich, H. Manual Separation of the Placenta and Exploration of the Uterus (*Manuelle Placentalsekung und Uterusaustastung*). 1934 Koenigsberg 1 Fr., Dissertation

Olbrich reports the results of manual separation of the placenta and manual exploration of the uterus in 5,918 deliveries in the Municipal Gynae

gical Clinic of Danzig. Altogether, manual separation of the placenta was done in 125 (2.1 per cent) of the deliveries. The total mortality (2 deaths) was 1.6 per cent and the total morbidity (38 cases) was 30.4 per cent. As in both of the fatal cases, obstetrical manipulations had been performed before the patient entered the author's service, the manual separation of the placenta cannot be regarded as the cause of death. In the first case there had been fever during delivery, and in the second an excessive loss of blood associated with placenta previa. If these 2 cases are subtracted there was no mortality in the 125 cases in which manual separation of the placenta was done.

The diagnosis of puerperal fever was made if there was only a single rise in the temperature to 38 degrees C or higher. In the cases of 14 of 38 women who were ill during the puerperium the condition was diagnosed as a complication arising from the genitalia. There were 10 cases of endometritis, 1 case each of puerperal sepsis and parametritis, and 2 cases of gonorrhea. If the cases of disease of extra genital origin are subtracted the morbidity is reduced to 11.2 per cent. This is low as compared with that shown by the statistics of Granzow.

Manual exploration of the uterus was done in 126 cases. According to Granzow's compilations its average total frequency is 1.94 per cent. Retained placental remnants were found and removed in only 4.3 per cent of the cases. A puerperal disturbance occurred in 15 (11.9 per cent). However, in only 4 (3.2 per cent) of these was the fever of genital origin. Therefore the corrected morbidity was 3.2 per cent, whereas the corresponding morbidity shown by Granzow's statistics was 21.3 per cent. There was no mortality.

In conclusion the author states that the type of procedure used in the third stage of labor (Crede, forced Crede, or some other method) had no decisive influence on the incidence of retention of placental remnants.

(KARL KOCH) JOHN W. BRENNAN, M.D.

PUERPERIUM AND ITS COMPLICATIONS

Peckham, C. H. Statistical Studies on Puerperal Infection. II. An Analysis of 545 Cases of Puerperal Infection (Including a Comparison Between Them and a Similar Group of Cases With Normal Puerperia). *Am J Obst & Gynec* 1936 31 582.

A detailed analysis and comparison has been made of 2 series of women delivered at or near the Obstetrical Services of the Johns Hopkins Hospital, Baltimore. In one group the puerperium was normal. In the other it was febrile because of puerperal infection. Cases of cesarean section were excluded. The purpose of the comparison was to determine what factors may predispose to the development of intra uterine infection.

It was found that the incidence of operative delivery was much higher in the group of cases with

puerperal infection than in the cases with a normal puerperium. Puerperal infection occurred much more frequently in colored than in white women, and the difference was significantly greater with spontaneous than with operative delivery. Women in the earlier years of their childbearing careers and primiparas were more predisposed to intra uterine infection than women of the older age groups and multiparas. The time of admission to the hospital in terms of duration of labor seemed to play no part in the development of an infective process.

The incidence of rupture of the membranes prior to admission to the hospital was almost 3 times as high in the cases in which puerperal infection occurred than in those with a normal puerperium. Rupture of the membranes occurring more than twelve hours before delivery seemed definitely to predispose to infection. However, premature rupture of the membranes either before the onset of pains or early in labor was apparently of little importance provided delivery was consummated within the time period mentioned.

Vaginal examination to corroborate or amplify the findings of rectal examination was associated with no added danger.

In the cases in which infection occurred the duration of the first and second stages of labor of both primiparas and multiparas was significantly longer than in the cases in which the puerperium was normal. Depending upon parity and the type of delivery, the mean duration varied from one to ten and one half hours in the 2 groups, but was persistently higher in the cases of infection.

In the cases of infection the incidence of perineal tears and of episiotomy was only slightly increased, but the incidence of cervical lacerations of sufficient extent to require immediate repair was 3 times as great as in the cases without infection.

The amount of blood lost subsequent to delivery was significantly greater in the cases with infection than in those in which infection did not occur. The incidence of postpartum hemorrhage (600 c.c. or more) in the 2 groups was 10.67 and 4.21 per cent respectively.

In the cases with puerperal infection intrapartum infection (a temperature during labor of 100.4 degrees F or above) was almost 4 times as frequent, and intercurrent disease, particularly syphilis, pyelitis and respiratory infection, was a complicating factor much oftener than in the cases without puerperal infection.

The mean number of days between delivery and the onset of infection as indicated by a rise in the temperature to 100.4 degrees F or above was three. In 84 per cent of the cases the onset of infection occurred during the first four days. The average duration of the fever was four and seventy three hundredths days and was longer in patients with operative delivery than in those with spontaneous delivery. In 86 per cent of the patients the febrile manifestation disappeared within seven days. The mean highest temperature during the infective

process was 102.2 degrees F. The fever reached 103.0 degrees F. in fewer than 25 per cent of the total group.

Cultures of material obtained from the uterus, which were made in more than 60 per cent of the cases, showed some variety of streptococcus in over 75 per cent, but the streptococcus hemolyticus was found in only 6 per cent. The percentage of anaerobic streptococci was higher in cases of spontaneous delivery than in those of operative delivery, whereas the percentage of aerobic nonhemolytic streptococci was higher in the former than in the latter. The colon bacillus was found twice as often after operative as after spontaneous delivery.

Of the total number of women with puerperal infection, 38.4 per cent were white and 61.6 per cent were colored. In contrast, 60 per cent of the infections due to the hemolytic streptococcus occurred in white women, whereas only one third and one fourth of those due to the aerobic non hemolytic and anaerobic streptococcus respectively occurred in white women.

Division of the cases of anaerobic streptococcus infection according to whether delivery was spontaneous or operative approximated closely a similar division of the cases with a normal puerperium, whereas such a division of the cases of infection due to the hemolytic and non hemolytic varieties of streptococci approached more closely a similar division of the cases with puerperal infection.

The total maternal mortality was 1.28 per cent. The majority of the deaths were due to the hemolytic streptococcus.

In more than one fourth of the total number of cases of infection the labor and delivery had been normal and without intravaginal manipulation. In all of this large group of cases delivery occurred spontaneously, labor was not prolonged, there were no vaginal examinations, no lacerations occurred in the perineum or cervix, and bleeding after delivery was not excessive. Many of the patients were probably self infected or infected by digital manipulation during labor, by intercourse shortly before or during the early hours of labor, or through the blood stream from a focus of infection elsewhere in the body. In some, the infection was probably of gonococcal origin. In others it was due undoubtedly to streptococci from the nasal spray of an attendant at the delivery or the patient herself. It cannot be stated definitely that any of these cases were instances of autogenous infection, but the author regards it as significant that, of a large group of cases of puerperal infection, more than 25 per cent must be classed as unpreventable in the light of present obstetrical knowledge. EDWARD L. CORNELL, M.D.

Liepmann, W. A New Method for the Treatment of Women With Puerperal Fever (Eine neue Methode zur Behandlung fieberhafter Wocheninnen). *Wien med Wchschr*, 1936, 1, 5.

The author reports his experience with the combined serum alcohol method of treating febrile

puerperal disease. His discussion is based on 565 cases. Four hundred and thirty-five of the cases were treated only with horse serum which was freshly obtained, pasteurized for only a short time and employed without the addition of phenol. The mortality in this group was 0.9 per cent. One hundred and twenty-five cases were treated with horse serum combined with the intravenous injection of 33 per cent alcohol, one or more injections of 100 c.c. being given according to the severity of the condition. Most of these were severe cases. In this group the mortality was 8.8 per cent. Finally, 5 cases were treated with alcohol alone. All of these were cured. The total mortality in the 565 cases was 2.6 per cent. Most of the cases which ended fatally were those of women who were moribund when they were brought to the hospital or cases with complications such as severe toxemia or a great loss of blood.

The author emphasizes the low mortality in the severe cases as compared with the statistics of the Gynecological Clinic of the Frankfurt University which show a mortality of 36.4 per cent in 187 cases of severe puerperal fever.

The casts of women with spontaneous delivery who were admitted with infection are compared with those of women with spontaneous delivery who developed infection in the clinic. The results in the latter group were better as treatment could be given immediately.

The good therapeutic results in cases of septic abortion are particularly emphasized. Eighty-two mild cases were cured by serum treatment, and 18 severe cases were treated with the serum alcohol combination with a mortality of 3 per cent. This mortality was considerably lower than that of Benthin whose statistics show a mortality of from 9 to 10 per cent. The alcohol treatment is especially indicated in pyemia, in which condition it considerably reduces the number of chills. It is of no value in puerperal peritonitis.

The author does not attempt to explain the mode of action of the alcohol in the organism. He concludes that in all cases of puerperal disease an injection of serum should be made on the first day that fever occurs, and if chills occur, 33 per cent alcohol should be injected. This treatment should be repeated immediately if a new elevation of the temperature occurs. It is recommended particularly for cases of septic abortion.

(VOLK.) HARRY A. SALZMANN, M.D.

MISCELLANEOUS

Wallart, J. Decidual Ectopic Vegetations Particularly in the Ovary, During and in the Absence of Pregnancy (Les végétations déciduales ectopiques pendant et dehors de la grossesse, en particulier celles de l'ovaire). *Gynéc et obst* 1936, 33, 134.

The chief functions of the decidua are to prepare for nidation of the impregnated ovum and supply

the ovum with nutrition until communication is established between the blood vessels of the embryo and those of the mother. The cells of the decidua, originating from certain special mesenchymatous cells of the mucosa of the uterus, are food reservoirs. They contain glycogen, albumins, lipoids, and mineral substances.

However, decidual tissue is found outside the uterus in various places in the pelvis and abdomen. Such extra-uterine decidua is called 'ectopic decidua'. It never occurs in the thorax. It has been found particularly in the ovary, and has been the subject of a great deal of investigation. It is very frequent, and has even been considered physiological during pregnancy. It may occur in the form of plaques or small nodules which on the peritoneum have been mistaken for tubercles. On the ovary it may occur also in the form of villi or small mushroom-shaped structures. These may originate from the albuginea which may be transformed in certain areas into a true decidua. The cortex also may be transformed into decidual tissue in considerable areas. From the cortex the decidual tissue may extend in the medulla to the hilus and even to the rete. It may be found beneath the folds of the mesovarium in fact in any part of the gland. The author has seen cases in which a third of the cortex was replaced by decidual tissue. Kehrer reported a case in which all of the connective tissue cells of a lutein cyst were found to have been transformed into decidual cells.

The morphological characteristics of these ectopic decidual structures are exactly the same as those of the true decidua. The cells contain glycogen. As colloid has been found in them an epithelial origin has been deduced. The structures are very vascular indicating that these vegetations have a physiological function during pregnancy. After termination of the pregnancy they are generally absorbed leaving no scars.

Until recently it was generally believed that the formation of decidua is entirely dependent on the function of the corpus luteum. Experimental work by a number of investigators is cited. However, some of the findings have shown a relationship between the hypophysis and the development of decidual tissue. It has been shown also that the anterior lobe of the hypophysis contains a lactagogue substance.

The author reports four cases in which decidual tissue was found in the ovaries. The women ranged from fifty-six to eighty-eight years of age, being therefore at a time of life when the corpus luteum and the interstitial gland of the ovary, formerly considered necessary for the formation of decidual tissue, were no longer functioning. All four of them had tumors of the uterus. In three, function of the hypophysis was particularly active, and in one the hypophysis was irritated by the presence of a tumor. Three had active mammary gland tissue. In all, the cortex of the ovary was highly developed and showed epithelial cystic structures. In three, active fibrous bodies were found. Their absence in the fourth may have been due to the advanced state of cachexia. The rete of the ovary was highly developed and active in all of the cases, and the paraglandular tissue in three. In the case with cachexia the paraglandular tissue was atrophied.

The author concludes from these cases and experimental work that there are very close correlations and humeral interactions between the hypophysis, ovary, uterus, decidual tissue, and mammary gland, and possibly connections with still other glands. The point of origin of the current which flows through this network has not yet been definitely determined. The development of decidual vegetations during the climacteric period supports the theory that the fibrous bodies of the ovary, the rete, and the paraglandular tissue have a functional value.

AUDREY GOSS MORGAN, M.D.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Cabot, H. The Methods of Diverting Urine Above the Level of the Bladder with Particular Reference to Problems of Technique *J Urol*, 1936 35 396

The urine may be diverted above the level of the bladder by nephrostomy or pyelostomy, uretero enterostomy, or cutaneous ureterostomy.

Except for very temporary drainage, nephrostomy seems preferable to pyelostomy. It is more effective and more certain to drain completely, continuously and without leakage. Displacement of the tube is more easily prevented, and the drainage is more easily prolonged for indefinite periods. The claim that nephrostomy involves greater injury to kidney structure is invalid since, when properly done it causes very little renal damage. When pyelostomy is performed, a fistula may occur, especially when the drainage is prolonged. Nephrostomy is not followed by fistula unless obstruction develops.

The technique of nephrostomy requires relatively little mobilization of the kidney except on its posterior surface and with exposure of the pelvis. The method suggested by Holland and Cabot is eminently satisfactory. The renal damage should be minimal. The older method of forcing an instrument through the cortex and feeling blindly for the pelvis causes excessive damage and does not allow accurate placement of the tube. It is applicable only when the kidney is completely delivered. The position of the tube in relation to the pelvis should be accurately determined. The pathway of the tube from the pelvis to the skin should be straight rather than tortuous. The tube should be placed in the lower calyx, and its inner end should be practically in contact with the median wall of the pelvis. Kinking of the tube should be prevented.

The after care following nephrostomy should include a careful check of the position of the tube within a few days by both a plain roentgenogram and a roentgenogram made after moderate filling of the pelvis with a solution used for intravenous pyelography. This gives a record for future reference. The tube should not be removed for at least ten days. If prolonged drainage is indicated the tube may be left in place for a period up to three weeks. As a rule it should not be moved as long as it drains satisfactorily and does not become incrustated. A No 22 F rectal tube with an open end and an eye in the side is best. When the tube is changed the new tube should be introduced at once without changing the patient's position. The tube should be adjusted and fastened in position only after it aspirates completely. A check of its position by x ray examination is then indicated. In

prolonged or permanent nephrostomy, the tube should be left in place even for as long as three or four weeks if it drains satisfactorily, the wound remains dry, and there is no incrustation. After a time, the patient may be taught to change the tube himself.

Uretero enterostomy is indicated in congenital abnormalities (such as ectrophy of the bladder), inoperable vesicovaginal fistula, intolerable bladder tuberculosis, intractable interstitial cystitis, and cancer of the bladder. As a rule it should be limited to patients whose ureters are still within substantially normal limits. Very careful pre-operative preparation of the intestinal tract is important. This should include complete emptying of the colon followed by a low residual diet and cleansing enemas for from thirty six to forty-eight hours.

If there is no contra indication, the author prefers the two-stage operation in which the loop of the sigmoid is used for the right ureter and the lowest portion of the sigmoid loop near its junction with the rectum is used for the left ureter. After the large intestine has been drawn out through an incision in the peritoneum beneath an oblique lower quadrant incision and the anastomosis has been effected, the intestine both above and below is securely fixed to the peritoneum and extraperitonealized. While leakage is avoided, a fistula may occur. The chief contra indication to the two stage method is cancer. When cystectomy seems indicated and the ureters are unobstructed simultaneous bilateral uretero enterostomy is preferable. It is rarely wise to do a simultaneous bilateral uretero enterostomy and a total cystectomy in one stage. The portion of the ureter which is mobilized should be that which leads directly from the pelvic brim to the point of intestinal anastomosis. Tension between the ureter and intestine should be prevented. The oblique submucous plan of Coffey seems more satisfactory than direct implantation. An unnecessarily long tunnel in the intestinal wall should be avoided. The best length seems to be about 3 cm. The flaps of peritoneum and musculature should be ample. The ureter should be held in the intestine by a single suture (Coffey) passed through its lateral margin and introduced into the lumen of the intestine to emerge 2 cm. lower down. When this suture is tied the ureter is sufficiently fixed without the use of other sutures. The author tucks the short end of the catgut suture holding the ureter back up the lumen of the ureter for about 2 cm. (C. H. Mayo). No other sutures are placed in the wall of the ureter. The use of tubes or other mechanical devices for drainage favors infection.

The after-care following uretero enterostomy should include the prompt forcing of fluids (sub

cutaneously or intravenously), the insertion of a rectal tube for from ten to fourteen days the withholding of food and water by mouth for at least forty eight hours, and the administration of nothing but water for from three to five days. Feeding should be begun with liquids without milk, and this low residue diet should be continued for at least a week. Enemas are contra indicated for at least ten days. When the patient is up and about renal function should be tested by intravenous urography.

Cutaneous ureterostomy should be limited almost exclusively to cases with gross abnormality of the ureters and an intolerable condition of the bladder such as intractable tuberculosis, interstitial cystitis or cancer.

The normal ureter is much more easily manipulated than the normal ureter as it permits the passage of a full sized catheter and better drainage. The inguinal region is not the most satisfactory region for a cutaneous ureterostomy. A point internal to the anterior superior iliac spine seems more desirable because at this site less of the ureter is used and the blood supply is best. The ureter is exposed and mobilized through an oblique incision the center of which lies on a line between the anterosuperior iliac spine and the umbilicus. With these two incisions the risk of infection is less. In cases in which a bilateral simultaneous cutaneous ureterostomy and total cystectomy are to be performed in one stage a median incision is necessary. Through this the necessary manipulations of the ureters can be done. As a rule the author does the ureterostomies at one operation and the cystectomy at another. The choice is presented only in cancer of the bladder. With the extraperitoneal method the ureter is exposed at the pelvic brim and freed downward for a distance sufficient to allow the free end to be brought into the wound and to project beyond the skin for 2 or 3 cm. It is also freed upward well above the pelvic brim so that it will lead quite directly and without turns from the renal pelvis to the point of exit in the skin. After the mobilization of the ureter a soft rubber catheter of a size to fill the lumen without causing discomfort is carefully introduced beyond the ureteropelvic junction and the accuracy of its position is tested by aspiration. The catheter is fixed in position by two catgut sutures tied snugly but not so as to constrict the lumen of the catheter. The ureter and catheter are then sutured into the wound in such a way as to prevent a sharp angle. The introduction of sutures into the ureter is likely to lead to fistula or stricture. When there is doubt as to the presence of infection drainage is indicated.

The after care following cutaneous ureterostomy should include an x-ray check up of the position of the tube in relation to the pelvis. After the projecting ureter has sloughed the catheter should be maintained in place by heavy silk ties attached to pieces of adhesive plaster. Urinary leakage will occur if the catheter projects too far into the pelvis or becomes withdrawn into the ureter. During convalescence the kidney should be irrigated daily with a bland

solution. The condition of the kidney, and particularly the presence of urea splitting organisms causing incrustation will influence the frequency of change of the tubes. LOUIS NEUWELT M.D.

De Pujasseleyr R. Considerations on the Pathogenesis of Polycystic Kidney in the Light of New Theories Concerning the Embryological Formation of the Kidney (Considerations sur la pathogénie des reins polykystiques à la lumière des théories nouvelles sur l'organogénèse du rein). *J. d'ur. méd. et chir.*, 1936 41 201.

The author reviews the literature on polycystic kidney, discusses the various theories regarding the causation of the condition beginning with the theory of inflammation advanced by Virchow, and reports three cases in detail with illustrations showing the gross and microscopic changes.

In conclusion he states that the theory of Ribbert has been disproved by the studies of McKenna and Kampmeyer. Polycystic kidney is due not to a dilatation of the urinary tubules by retention of fluid resulting from non union of the excretory tubules but to a developmental disturbance affecting the equilibrium between the epithelial and connective tissue. MARSH W. POOLE M.D.

Brown A. Ureteral Diverticula. *Hast. J. Surg. Obst. & Gynec.* 1936 44 270.

Brown reports a case of diverticulum of the right ureter in a child aged two years. The diverticulum presented itself as a tumor the size of an orange in the right lower quadrant of the abdomen and was cut down upon at exploratory operation. It was found to be entirely retroperitoneal. It was removed completely and its communication with the ureter closed by a double row of fine sutures. Recovery was uneventful.

The author believes that the diverticulum in this case was congenital and due to failure of one of the ureters of a double bud to reach and join with the metanephros. He states that if this ureter bud had joined with the metanephros, a double kidney and ureter would have resulted. This theory is supported by the fact that all of the layers of the ureter were represented in the wall of the diverticulum.

THEOPHIL P. GRAVER M.D.

BLADDER URETHRA, AND PENIS

Constantinesco P. Vesico Ureteral Reflux in Intravenous Urography (Le reflux vésico urétéral dans l'urographie intraveineuse). *J. d'ur. méd. et chir.*, 1936 41 247.

The occurrence of vesico ureteral reflux during examination by intravenous urography has recently been emphasized as a potential source of error in the interpretation of the findings. The author states that when the bladder is normal such a reflux can occur only after the bladder has been filled but when the bladder is diseased and its capacity is very small the reflux may begin almost as soon as any fluid

reaches the bladder and the bladder does not become distended. Therefore, to rule out this source of error, it is often necessary to check the descending filling fluoroscopically and to make a series of roentgenograms.

MAX M. ZWINGER, M.D.

Traczyl, S. Urethral Calculi (Les calculs de l'urètre). *J. d'uról méd et chir*, 1936, 224-234.

Although urethral lithiasis was known in antiquity, the history of the condition really began with Paré.

In the female, urethral stones are rare because the urethra is short, straight, and easily dilated. Most urethral stones are stones from the kidneys or bladder which have become lodged in the urethra. Stones formed primarily in the urethra are rare. These are formed behind an inflammatory structure or as the result of trauma or in a juxta urethral pouch.

About 42 per cent of urethral stones are composed of phosphates, 36 per cent of oxalates, 20 per cent of urates, and 2 per cent of xanthine, cystine, and other substances.

The author reports six cases of urethral stones, presenting photographs of the calculi and reproductions of the roentgenograms.

The methods of removing urethral stones are simple manipulation with dilatation of the urethra, removal by means of the urethroscope and external urethrotomy. The author discusses these procedures.

MARSH W. POOLE, M.D.

Campbell, M. F. and Fein, M. J. Malignant Melanoma of the Penile Urethra. *J. Urol*, 1936, 35-37.

In a search of the literature the authors were able to find only one case similar to the case they report in this article. In their case the primary growth was in the penile urethra near the penoscrotal junction. On first examination lumps were discovered in both groins and the lower abdomen. Biopsies on the inguinal glands and the primary tumor showed the neoplasm to be a malignant melanoma. The penis was removed down to its perineal portion. The patient lived about one year after the operation. Autopsy was not performed.

The authors discuss also sarcoma of the male urethra.

THEOPHIL F. GRAUER, M.D.

GENITAL ORGANS

Wang, S. Cysts of the Utricle (Utriculosysten). 1935. Jena, Dissertation.

The results of anatomical research, especially such as those of Springer and Englisch, make it apparent that cysts of the utricle are by no means rare and would doubtless be found more frequently at autopsy if more attention were paid to the posterior urethra. In the course of two or three years, four cases were observed in the Clinic at Jena.

In a detailed discussion of the embryological causes of the cysts which are to be regarded as mal-

formations, Wang reviews the various theories presented in the world literature.

The cysts apparently first make their appearance in the fifth embryonal month. Quite frequently they are found in the newborn. As a rule they do not cause symptoms before the third decade. This is explained by the author by the fact that a marked increase in their size occurs first with the onset of puberty. The symptoms consist of a sanguino-mucous discharge, dysuria which may be increased to the point of urinary retention, pain in the anus, perineum, and neck of the bladder, and sexual disturbances. Therefore, they are not characteristic.

As treatment, Wang recommends electrocoagulation of the cyst wall which protrudes into the urethra.

Several clinical histories and sketches showing the shape and position of the cysts are included in the article.

(JANSSEN) HARRY A. SALZMAN, M.D.

Abeshouse, B. S. Vasectomy for the Prevention of Epididymitis in Prostatic Surgery. *Am. J. Surg.*, 1936, 31-8.

The reported incidence of epididymitis in non-vasectomized patients ranges from 6 to 82 per cent and averages 27.6 per cent. The condition is more frequent after suprapubic prostatectomy than after perineal prostatectomy. Its average incidence after transurethral resection is about 6 per cent.

Preliminary vasectomy has been a common procedure since 1926. The author cites several methods of ligating and resecting the vas. By the term "vasectomy" he means partial resection of the vas. He states that when simple ligation is done the patency of the lumen may be re-established by as early as the twenty second day. There are reports of the development of epididymitis in as many as 10 per cent of cases following simple ligation. The reported incidence of the condition after vasectomy is 1.5 per cent.

In the technique used by the author the vas is exposed through a small incision on each side of the scrotum, at least 1 cm. is resected, and the cut ends are ligated. The distal end is then covered by tunica vaginalis and the proximal end is anchored to the tunica vaginalis. The advantages of this method are summarized as follows:

1. Adequate exposure is obtained.
 2. The desired amount of tissue can be removed and the ends securely ligated.
 3. Regeneration is impossible.
 4. The proximal end is on the outside of the tunica vaginalis and an abscess here may be incised.
 5. The proximal end may be injected with case.
- Two hundred and eight cases are analyzed. Complications were fewest in the 78 cases in which vasectomy was done before any other procedure, developing in only 4 such cases. Of 75 cases in which vasectomy was performed after the institution of catheter drainage complications developed in 9, and of 55 cases in which it was done in combination with another procedure they developed in 10. The

incidence of the various complications was scrotal hematoma, 0.06 per cent, scrotal edema, 1.44 per cent, scrotal abscess, 2.40 per cent, vasitis, 7.21 per cent and peritonitis or intestinal obstruction 0.48 per cent. In none of the cases did epididymitis develop.

The treatment of each type of complication is described and a case with fatal complications is reported.

GILBERT J. THOMAS, M.D.

Denk W., and Uebelhoer R. *Hormone Therapy of Retentio testis* (Zur Hormontherapie der Retentio testis). *J. internal de chir*, Brussels, 1936, 1: 369.

According to older views mechanical factors were the only causes of non descent of the testicles but it is now believed that hormonal disturbances may have some relationship to the condition.

Attention was first called to the influence of hormones of the anterior lobe of the pituitary gland on cryptorchidism in 1929 by Shapiro who expressed the opinion that failure of testicular descent is not the cause, but the result of testicular hypoplasia of hypophyseal origin.

A series of experiments performed by various other investigators revealed that there is a definite relationship between the anterior lobe of the pituitary gland and the descent of the testicles. It was shown that extirpation of the pituitary gland delays, and the administration of gonadotropic hormones accelerates testicular descent. Testicular hormone has a similar effect on the male sex organs.

Denk and Uebelhoer are of the opinion that in early childhood and especially in the cases of obese children surgical treatment of cryptorchidism is often

contra indicated. It is indicated only when the failure of testicular descent is due exclusively to mechanical factors. As such mechanical factors cannot be detected readily, surgery should be considered only after other therapeutic measures have proved unsuccessful.

Five years ago the authors began to treat cryptorchidism with hormonal preparations. Twenty-three children were treated in this manner and kept under observation. In eight cases testicular descent occurred spontaneously following the treatment and in ten distinct improvement resulted. In five cases the treatment failed completely.

Testicular preparations were given by mouth, and gonadotropic hormones derived from the anterior lobe of the pituitary gland were injected intramuscularly. Preparations made from pregnant urine proved to be most effective. A preparation called "pregnil" was employed. On the average 500 rat units were injected intramuscularly twice a week.

In order to prevent certain untoward reactions the treatment was limited at first to the administration of testicular preparations by mouth. If no results were obtained, the intramuscular injections of hypophyseal preparations were added.

It was found that the treatment can be given over a period of weeks or months without untoward effects. If no improvement is obtained within six months it should be discontinued for an interval of a few months and then resumed.

In cases which do not react to hormonal stimulation the failure of the testicles to descend may be due to mechanical factors. In such cases operative treatment is indicated.

RICHARD E. SORNA

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC

Chesterman, J. T. Solitary Plasmocytoma of the Long Bones. *Bull J Surg*, 1936, 23, 727

Chesterman reports a case of solitary plasmocytoma of the tibia which he believes to be the first of involvement of that bone by such a tumor to be recorded. In the literature he was able to find only twelve other cases of plasmocytoma of bone. From a review of these he has come to the conclusion that tumors of this type arise from the adventitial cells of the small blood vessels.

He states that plasmocytomas may occur also in the nasopharyngeal cavity, the larynx, and many other regions of the body.

In every recorded case of solitary plasmocytoma of bone the first symptom was localized pain. There was very little swelling and no systemic sign of multiple myelomatosis. The most constant early findings was a solitary cyst in the shaft of the bone.

The average age period was the fourth decade, and in all except one case the tumor arose in the shaft of a long bone. Pathological fracture occurred in twelve of the thirteen cases.

In conclusion the author states that biopsy should be done in every case of primary tumor of the shaft of a long bone. If the neoplasm is found to be of endothelial origin it should be treated by deep roentgen therapy, but if it is found to be a plasmocytoma, curettage and bone grafting should be done.

PAUL C. COLOMBA, M.D.

Rehbock, D. J., and Hauser, H. Liposarcoma of Bone. A Report of Two Cases and a Review of the Literature. *Am J Cancer*, 1936, 27, 37.

Primary liposarcoma of bone is rare. Up to the present time only seven cases have been recorded. The tumor grows slowly over a period of years. Cranial metastases seem a common feature. The neoplasms appear to be sensitive to irradiation.

Because of the difficulty in the diagnosis and the rarity of liposarcoma of bone, the authors report two cases in detail. The first case, No. 1904 of the Bone Sarcoma Registry of the American College of Surgeons, was that of a woman fifty-six years old. Following a spontaneous fracture of the right femur, roentgen studies revealed an irregularity of the bony cortex above and below the fracture with a marked periosteal reaction. The fracture failed to heal, and nine months after its occurrence aspiration biopsy disclosed the presence of a malignant tumor of uncertain nature.

Autopsy two months later revealed metastatic growths in the thyroid, heart, lungs, liver, spleen, pancreas, adrenal, kidney, bladder, bowel, brain,

spinal cord, dura mater, and bones of the skull. The metastases were similar microscopically to the tumor in the thigh. Necrosis of the tumor was a prominent feature. Sections stained with Sudan III showed minute fat droplets within the cytoplasm of numerous tumor cells.

Only when the autopsy was performed and the diffuseness of the lesion was recognized was it suggested that the tumor might be a liposarcoma of bone. The widespread metastases, especially in lymph nodes and bone, and the radiosensitivity of the tumor were not in keeping with the usual findings in osteogenic or periosteal sarcomas. It seems most probable that the tumor was primarily in the femur. The histological diagnosis of liposarcoma was supported by the presence of tumor cells resembling embryonic fat cells and by minute fat droplets within the cytoplasm of apparently unde-generated cells. The histological diagnosis of liposarcoma was confirmed by Karsner, Ewing, and Stenart.

The second case, No. 1224 of the Bone Sarcoma Registry, was that of a man sixty years of age. Death occurred two weeks after the patient's admission to the hospital. The pathological diagnosis was liposarcoma of the right ilium with extension to the sacrum. No metastases were found.

The gross destruction of the iliac bone by the tumor and the extensive anterior and posterior projections of the soft tissue from the bone indicated that the neoplasm was primary in the ilium. The histological diagnosis of liposarcoma seems unquestionable. The characteristic feature was the presence of tumor cells having the morphological features of embryonic fat cells. Fat droplets were numerous in the cytoplasm although many cells showed degenerative nuclear changes and the presence of fat in these cells may be interpreted as a degenerative change. There was unanimous agreement on the diagnosis by the Committee on Bone Sarcoma of the American College of Surgeons.

NORMAN C. BULLOCK, M.D.

Watson Jones, R. Adhesions of Joints and Injury. *Bull M J*, 1936, 1, 923.

Joint stiffness following injury is due to adhesions which are almost entirely periarticular and involve the folds of the joint capsule. Such adhesions result from a serofibrinous exudate which becomes organized and is replaced first by young connective tissue and later by adult fibrous tissue. The exudate is due primarily to the initial injury, but may occur or recur as the result of neighboring infection, venous stasis, edema due to muscular inactivity, or immobilization. Dense adhesions which cause permanent loss of joint motion are due to persistence

and recurrence of serofibrinous exudation in the periparticular tissues

The adhesions of immobilization uncomplicated by other factors are temporary, being broken down by the patient's exercise. The exudate which occurs early about an injured joint is absorbed and as a rule the resulting stiffness is overcome readily by cautious active movement after the period of immobilization. One or more of the following factors may cause persistent or recurrent exudation in the periparticular tissues and result in permanent stiffness of the joint

1 Disuse with continued venous stasis. Simple immobilization causes some venous stasis. If, in addition, there is no muscular movement the stasis becomes aggravated. The joints at each end of a fractured long bone must be immobilized, but other joints of the limb should be allowed to move. In forearm fractures the fingers and shoulder should be mobilized in fractures of the femur the ankle and toes, and in fractures of the wrist (Colles fractures) the elbow and fingers. Movement of these joints stimulates the circulation of the entire limb and tends to prevent or check venous stasis.

2 Recurrent edema in a fractured limb. This is both unnecessary and harmful. It is harmful because the accumulated fluid is a potent factor in the formation of adhesions. It may be prevented by proper immobilization, early active motion of the fingers or toes, elevation of the part and elastic bandaging after removal of the cast.

3 Massage, manipulation and passive movements. These often cause rather than cure, stiffness of joints. When adhesions already present are over stretched a reactionary exudation with edema occurs and fresh adhesions are formed. Under such repeated treatments the condition of the joint, especially a joint of the arm, may grow progressively worse. As the leg joints are more resistant their condition may improve in spite of such therapy. Massage, passive motion and stretching have no place in the treatment of stiff elbows and fingers. Localized adhesions which cause discomfort and weakness rather than limitation of motion as those which may occur in the shoulder and knee may be loosened by manipulation, but this should be done gently and not more often than every six weeks and should be followed by active motion only.

4 Immobilization in a position of strain or beyond the normal limit of movement. This has the same effect as a repeated traumatic synovitis, which causes recurrent exudation and may result in marked joint stiffness, especially in the fingers.

5 Continued infection near a joint. This occurs particularly in septic hands. It is very important to control the infection as soon as possible and to prevent edema by elevation and the avoidance of too frequent dressings or too long immersion in antiseptic baths. Immobilization should be confined to the joint involved.

6 The continued irritation of foreign bodies near joints such, particularly, as pins and wire used for

skeletal traction and wires, plates and screws employed in the open reduction of fractures. These foreign bodies are a source of irritation with resulting exudation and are a common cause of joint stiffness. This is true especially in fractures of the olecranon. In the open reduction of such fractures only catgut should be used.

CHESTER C. GUY, M.D.

Pettinari, V. Primary Muscle Tuberculosis (Tuber colosa musculare primitiva). *Rassegna interna di clin e terap.*, 1936, 17, 61.

Muscle is very resistant to the tubercle bacillus. Tuberculosis of muscle, like most tuberculosis, is always interstitial. The muscle fibers themselves are not involved in the process. The infection reaches the muscle either by extension from an adjacent focus or through the blood or lymph stream. In 1924, Culotta collected from the literature sixty four cases of so called primary tuberculosis of muscle.

The author reports in detail a case of primary muscle tuberculosis in a woman fifty years of age. Two months before her admission to the hospital the patient noticed a small tumefaction in the posterior region of the right thigh. This gradually increased in size. It caused no pain but the right leg felt heavy and became fatigued more easily than the left. There was a slight afternoon elevation of the temperature.

Physical examination revealed moderate general arteriosclerosis and, in the medial third of the posterior portion of the right thigh, a moderately cyanotic area measuring 8 by 10 cm., over which the skin was somewhat edematous but freely movable on the underlying tissues. Palpation in the cyanotic region disclosed a lemon sized, rounded, smooth, fibrous hard and uniform tumor with indistinct deep limits which was movable in a lateral direction more than in the longitudinal direction when the muscles were relaxed, but quite immovable in any plane when the muscles were contracted. There was no local heat. In the inguinal region there were numerous small smooth, painless lymph nodes. Roentgen examination of the thigh region was negative for bone changes. Roentgen examination of the lungs revealed an increase in the hilar markings with some calcification of the lymph nodes. The leucocyte count was 8,300. The Wassermann reaction was strongly positive. Anti luetic treatment caused no change in the lesion.

Surgical exploration disclosed a subaponeurotic mass in the posterior muscles of the thigh which involved principally the biceps so that there was no plane of cleavage between the two. The tumor and adjoining muscles were removed *en bloc*.

The removed tissue was the size of a large apple, irregularly round, apparently well encapsulated, and fibrous hard. It had the appearance of a true tumor. Section of the mass revealed a central cavity filled with caseous material and surrounded by a very thick connective tissue capsule. Inoculation of the caseous material into ordinary culture media pro-

duced no growth. Smears were negative. Inoculations into guinea pigs were positive for tuberculosis.

Histological examination revealed a caseous, structureless mass bordered by a zone of reaction including connective tissue and infiltrating cells. The connective tissue barrier formed of fibrous tissue was widespread and separated the disease process from the muscle fibers. In this zone there were occasional giant cells and rare characteristic tubercles. The muscle fibers near the focus were markedly altered. In part they were atrophic and in part destroyed. They presented an active proliferation of the nuclei of the sarcolemma which suggested giant cells. In longitudinal section these presented the characteristic appearance of a tubular limiting membrane filled with nuclei. There were also zones of cellular infiltration in the form of connective tissue nodules of adult sclerotic connective tissue. The blood vessels were not abundant. They showed no noteworthy changes except those in the caseous areas. All of the lesions were distributed irregularly with the tubercles widely separated. At a distance from the inflammatory changes the muscle fibers appeared normal.

When the patient was seen ten months after the operation she was apparently cured of the thigh lesion but had developed a carcinoma of the cervix.

The most common site of so called primary tuberculosis of muscle is the lower extremity. Whatever the location, surgical excision is indicated.

A. LOUIS ROSE, M.D.

Lamy, L., and Weissman, L. Vertebral Angioma (*L'angiome vertébral*). *Rev d'orthop.* 1936, 43, 115.

Vertebral angioma was first recognized roentgenologically by Perman in 1926. The first case to be recorded in France was reported in 1928 by Guillaumin, Decourt, and Bertrand. To date, about twenty cases have been reported.

The author's case was that of a woman twenty-three years of age who complained of lumbar pain and rigidity which had persisted since a fall five months previously. A roentgenogram made at the time of the injury showed a peculiar flattening of the first lumbar vertebra. The attending physician applied a cast and placed the patient at complete rest. When the patient was seen by the authors there was no improvement of the symptoms and a slight kyphosis had developed. Roentgenograms disclosed irregular areas of decalcification and an expansion of the vertebral body which gave it convex outlines. Treatment first by casts and later by braces resulted in complete cure at the end of two years. However, there was no change in the roentgenographic appearance of the vertebra.

In reviewing the literature, the authors found that angiomas of the vertebrae are relatively frequent. Schmorl found them in 10 per cent of 10,000 spines examined at autopsy. Those discovered incidentally at roentgenographic examination are usually found in aged individuals, whereas those causing symptoms are usually found in persons

between twenty and twenty-five years of age and most often in females.

Symptoms are apt to appear following a traumatism which may be slight. This fact makes the lesion of medicolegal importance.

The thoracic region of the vertebral column is most often affected. Angiomas coexisting in other organs are common.

Medullary symptoms when present, consist of a progressive spastic paraplegia without pain. However, pain may occur without medullary compression. It is localized in the spine or has a radicular distribution.

The diagnosis of angioma of the vertebrae is possible only by roentgen examination. The general contours of the vertebrae are always preserved and the borders of the image are sharp. The intervertebral spaces are unchanged. The deformity is of the nature of an expansion of the body or some other portion of the vertebra. This is particularly characteristic. The internal structure of the bone is altered by the presence of multiple, clear spaces giving it a spongy, vacuolated appearance. The intervening trabeculae are well defined.

While angiomas of the vertebrae may simulate a variety of conditions, the symptoms and the history most strongly suggest Kummel-Verneuil's lesion. However, the roentgen appearance is quite different. Syphilis alone is known to produce a similar picture, but in this condition the lesions change under treatment while an angioma remains unchanged.

The treatment of cases of vertebral angioma without paraplegia consists of immobilization and irradiation. When there are signs of cord compression operative treatment is necessary. However, it results in cure in only about 50 per cent of cases. Fatal hemorrhage is the usual complication.

ALBERT F. DE GROAT, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Crossan, E. T. Conservative Treatment of Acute Hematogenous Osteomyelitis. *Ann Surg.* 1936, 103, 605.

Of 117 cases of acute hematogenous osteomyelitis, pus was found in the bone in 12 and in the medulla and the subperiosteal space in 24. In 39 cases the medulla was exposed and found free from pus. In the remaining 42 cases the bone was not opened. Pus was present beneath the periosteum in 105 of the 117 cases. If this is not an argument against the intra-osseous origin of the infection, it is evidence that the pus finds an exit, that decompression occurs, and that spread of the infection can be limited without surgical intervention.

Of 4 cases in which operation was performed within forty-eight hours after the onset of the symptoms, pus was found in the subperiosteal space but not in the medulla. The evidence for a subperiosteal origin following trauma is as strong as the evidence of an intramedullary genesis.

In the reviewed cases the mortality was twice as high following early as following delayed operation. The author calls attention to the fact that the patient's margin of reserve is depleted by pain, insomnia, dehydration, the fright caused by his transference to a hospital, the shock of infection, and the shock of operation. Hasty operation is associated with danger of disseminating the infection and may result in embarrassment due to faulty diagnosis.

The following recommendations for treatment are made:

1. Delay operation until the patient's resistance has been improved by rest, transfusions, infusions, and adaptation to hospital surroundings.

2. Do not operate until local resistance of tissues has developed. According to the reviewed cases, the best time for operation is the second week of the disease.

3. Limit the operation to incision. Do not de-compress at the first operation. In the few cases in which incision reveals pus in the medulla, pack the soft parts for forty-eight hours before opening the bone.

RUDOLPH S. REICH, M.D.

Sorrel and Boppe: The Treatment of Acute Osteomyelitis Due to Staphylococci (À propos du traitement des ostéomyélites aiguës à staphylocoques). *Mém. l'Acad. de chir. Par.* 1936 62 769.

Sorrel states that well localized foci of staphylococcus osteomyelitis may give rise to a general septicemic infection or to multiple secondary foci. As staphylococci cause the formation of no or only very few antibodies, resistance to staphylococcal infection is poor. While vaccines, bacteriophage serums, and various chemicals have been used in the treatment of staphylococcus osteomyelitis and septicemia, main dependence must be placed on surgery. However, in the cases of four patients who were in a serious condition, Sorrel obtained good results from the use of electrocuprol as recommended by Brechot, although on several occasions it produced symptoms of shock. He considers this treatment justified in severe cases.

Of fifty-nine cases of acute osteomyelitis due to staphylococci recently treated at Sorrel's clinic, more or less complete recovery resulted in forty-eight and death in eleven. Sorrel distinguishes four types and reports an illustrative case of each. Among the reviewed cases there were five of the first type with superficial lesions. These were treated by incision and drainage of the subperiosteal abscess. One of the patients died subsequently as the result of the development of a secondary focus. In the twenty cases of the second type with intraosseous abscess the bone was trephined if it had not perforated spontaneously and the abscess cavity widely drained. The two patients who died had multiple foci. Of the twenty-eight cases of the third type, in which the general condition was poor and there were extensive bone lesions, resection of the diaphysis was done in twenty-six and trephination in two. In this group there were three deaths.

all those of patients with multiple foci. Six cases were of the fourth type with septicemia in which the bone infection was not the predominant lesion. In such cases early operation is not indicated. In one of the reviewed cases operation was done for the relief of pain. The suppuration still continues although the general condition has improved. The five other cases were fatal.

In continuing the discussion of the treatment of acute osteomyelitis, Boppe states that in the less severe cases he has obtained good results from strict immobilization of the affected limb combined with various medical treatments and followed by simple incision of the abscess or trephination and incision. In severe cases he does not hesitate to do a resection. He gives blood transfusions before and after the operation. In the medical treatment he employs vaccines, but without definite convictions as to their value.

Of seventy-four of his patients with acute staphylococcus osteomyelitis, four were adults, twenty-three were infants, and forty-seven were children from five to fifteen years old. One of the adults, two of the infants, and thirteen of the older children died. The two infants who died were not operated on. Of the thirteen older children who died, two died a few hours after their admission to the hospital without operation and eleven were operated on. Three of these children had multiple foci.

ALICE M. YEVENS

Bloch, J. C. and Zagdoun, J.: The Treatment of Digital Injuries of the Flexor Tendons (Le traitement des plaies digitales des tendons fléchisseurs). *J. de chir.* 1936 47 376.

The authors cite the difficulties in obtaining satisfactory results from the suture of wounds of the flexor tendons of the fingers as compared with injuries of the extensor tendons and of the flexors in the palm or at the wrist. This article is based on their experience in the treatment of twenty-two cases by the method of Bunnell. All of their cases were old. For such cases they advise delaying operation for from two to six months after the injury. The procedure described is as follows:

1. A curved incision is made at the tip of the finger or thumb and the distal end of the deep flexor tendon is pulled out and cut off at its attachment to the terminal phalanx.

2. A slightly curved incision is made in the palm near the wrist and carried through the skin and palmar aponeurosis. The proximal tendon end is then found and pulled out. The superficial flexor tendon is cut off as high as possible as only the profunda is used for the repair.

3. A catheter is passed from the wound in the tip of the digit to the wound in the palm and a tendon graft threaded through this tunnel with the Bunnell conductor. The graft is dead tendon preserved in alcohol by the method of Nageotte. Before use it is immersed in normal salt solution to remove the alcohol.

4 The deep flexor is pulled down into the palm by strong traction on its proximal end, partly divided at the highest level that can be reached, and bisected downward for a distance of several centimeters. The upper end of the graft is then sutured firmly by at least eight sutures to the flat surface presented. After this suture has been completed, resection of the excess portion of the deep flexor is done, allowing the junction of the graft with the proximal end of the deep flexor to ascend into the wrist above the level of the incision in the skin.

5 The finger is placed in semiflexion and the site at which the free end of the graft should be attached to the terminal phalanx is determined. A figure-of-eight suture of silk is then placed in the graft and the excess graft is cut off. The suture in the graft is anchored as follows:

Through a small subungual incision on the extensor surface of the finger a Reverdin needle is passed around the bone and one end of the suture in the graft is brought back. The other end is brought back similarly around the other side of the bone. The two ends are then tied on the dorsal aspect of the bone.

The operation is performed under general anesthesia with a tourniquet on the arm. Before the incisions are closed the tourniquet is removed and the bleeding controlled. The finger is fixed in complete flexion by means of a bandage and splints, but active and passive motion is begun the day after the operation. The splint is worn for three weeks, free movements then being allowed.

For good functional and anatomical results it is necessary for the patient to be able to flex the proximal phalanx on the metacarpal, the middle phalanx on the proximal, and the distal phalanx on the middle. The best results may be expected in the thumb as this digit has only two phalanges.

Of the twenty-two cases in which the authors performed the described operation in the period from 1925 to 1933, the follow-up records of sixteen are reported in detail. Fair or good results were obtained in ten. In six, the results were unsatisfactory, but all of the patients had been able to resume work.

The authors conclude that intervention should be attempted only when both deep and superficial flexor tendons are cut. If either remains intact, function is not likely to be improved by operation. For cases of extreme scarring, in which failure is almost certain, the authors advise arthrodesis of the middle and distal interphalangeal joints in partial flexion. When this is done the lumbricales and interossei flex the proximal phalanx and, with it, the whole digit.

MAX M. ZINNIKER, M.D.

Sorrel, E. Arthrorisis of the Foot (Arthrorisis du pied). *Rev. d'orthop.*, 1936, 23, 193.

Sorrel states that, in the foot, arthrorisis is employed especially in the region of the subtarsal joint, usually for the treatment of the sequelae of infantile paralysis. Anterior arthrorisis limits flexion of the foot and is therefore performed for talipes

calcaneus. Posterior arthrorisis limits extension of the foot and is employed in talipes equinus. Both types are often combined with subastragalar and mediotarsal arthrodosis. Many different techniques have been employed.

The author reports seventeen arthrorisis operations on sixteen children. Ten were of the posterior type (two on one patient) and seven of the anterior type. In eight of the ten posterior arthrorisis operations a double subastragalar and mediotarsal arthrodosis was done at the same time. In one case a double arthrodosis had been performed previously, and in one no arthrodosis was done. When the arthrorisis was performed to complete a subastragalar and mediotarsal arthrodosis the technique of Nove-Josserand or a technique very similar to it was used. The arthrorisis consists in detaching a bone plate from the upper surface of the calcaneum, leaving a posterior pedicle, and then pivoting the bone plate around the pedicle to bring it into a vertical position behind the subtarsal joint. This operation on the calcaneum is done at the point in the arthrodosis operation at which the subastragalar articulations have been opened. The author states that in his last three operations he employed an electrical chisel shaped cutting instrument instead of the hammer and chisel to freshen the articular surfaces and remove the plate from the calcaneum. It is possible that the vertical transplant from the calcaneum may lose its connection with the latter as the result of breaking of the bony pedicle. This is known definitely to have occurred in one of the author's cases and was suggested by the roentgenogram in another, but in each case the result of the operation was satisfactory, the transplant being held sufficiently firm either by a fibrous tissue connection with the calcaneum or by cicatricial retraction of the soft parts.

In five of the seven cases in which anterior arthrorisis was done, an arthrodosis was performed at the same time. In the two cases in which arthrodosis was not done the technique of Putti was used. In this operation the subtarsal joint is opened and, with the foot slightly extended, a section is cut from the anterior surface of the trochlea tali and raised so that it rests against the anterior surface of the tibia, where it is fastened by free osteoperiosteal grafts from the tibia. In the cases in which an arthrodosis was done with the arthrorisis, two techniques were used. In two cases a large graft was fixed obliquely from before backward and from above downward across the astragalus and the calcaneum, with its proximal end passing beyond the upper surface of the astragalus and resting against the anterior surface of the tibia, to limit the dorsal flexion of the foot. In the three other cases a double arthrodosis (subastragalar and mediotarsal) was done and completed by the technique of Putti. In the use of the latter method the bony fragments removed to freshen the joint surfaces in the arthrodosis operation can be employed for the osteoperiosteal grafts instead of grafts taken from the tibia.

The author has found the Nove Josseland technique most satisfactory for posterior arthrosis. While it involves a subastragalar arthrodesis, this is not an objection to a subastragalar as well as a mediotarsal arthrodesis is usually necessary. For anterior arthrosis Sorrel has found Putti's operation excellent. It can be done without arthrodesis, especially in the cases of young children in which arthrodesis may not be possible. In the cases of older patients it can be combined with arthrodesis to advantage.

ALICE M. MEYERS

FRACTURES AND DISLOCATIONS

Szombati S. Fractures in Childhood (Knochenbrüche im Kindesalter). *Orvosi Lapok* 1935 25 126

In the Surgical Division of the Children's Hospital of the White Cross Budapest 754 fractures have been treated during the last eight years. Five hundred and forty-two of the patients were between one and ten years of age and 217 between eleven and sixteen. Four hundred and eighty-nine were girls. Thirty-one (4.11 per cent) of the fractures occurred in the skull, 3 (0.39 per cent) in the trunk, 4 (0.53 per cent) in the pelvis, 381 (50.53 per cent) in the upper extremity and 335 (44.44 per cent) in the lower extremity. The incidence of fracture was highest between the fourth and eighth years of age. Fractures of the extremities are the most frequent fractures in children.

In the upper arm fracture of the lower third is more frequent than fracture of the middle third. Simultaneous breaks of both forearm bones are more frequent than in adults. In the reviewed cases the incidence of fractures of both the tibia and fibula was about the same as that of isolated fracture of the tibia. Fracture of the fibula alone was comparatively rare. In children fractures of the metacarpals and fingers are usually open fractures as are also fractures of the corresponding bones of the lower extremity. They are usually caused by direct violence.

In the reviewed cases there were 126 fractures into joints. Most of them occurred in the elbow. Fractures of the neck of the femur are very rare. In knee joint injuries breaking off of the condyles and fractures of the patella are frequent.

Pathological fractures occurred in 18 of the reviewed cases. In 10 of these the cause was rickets,

in 5 osteomyelitis, in 2, osteopetrosis, and in 1 congenital osteoporosis.

In respect to their mechanism, fractures occurring in children show an exceedingly changing picture. They include all forms of bending fractures. The characteristic types of break in the young are separation of the epiphysis and infraction.

In youth, all of the conditions favorable for the healing of fractures are present. Of the 754 fractures reviewed 743 healed with unimpaired function and 3 with slightly diminished function and 3 with restricted function. Six (0.79 per cent) of the patients died. Of the latter 5 had severe skull injuries.

The principles of the treatment of fractures in children are in general the same as those of the treatment of fractures in adults. In the cases of children the complications associated with imperfectly or poorly healed fractures are less to be feared. Joint stiffness and muscle atrophy do not occur even after long fixation and inactivity.

Of 754 cases of fracture 701 were treated conservatively. Operation was performed in 53. Apart from skull injuries operation was done in cases of non union, compound fractures of the extremities and fractures in which reduction was not possible by closed methods (joint fractures, interposition of soft parts, old malunited fractures).

The article is concluded with the following observations:

1. The statistics of the Children's Hospital and the Verebely Clinic at Budapest compiled simultaneously and supplementing each other prove that the majority of fractures occur in the first 2 decades of life, therefore in childhood and at the time of puberty.

2. The most common fractures in children are fractures of the femur which constitute 23.36 per cent of all fractures. The most common site of fracture of the femur is the middle third of the bone.

3. Characteristic fractures of childhood are the supracondylar and percondylar fractures of the lower extremity of the humerus which constitute 10.47 per cent of all fractures occurring in children.

4. Characteristic types of fractures occurring in children are the bone fissure, infraction and separation of the epiphysis.

5. In the treatment especially conservative measures promise good results.

BARBARA B. STIMSON, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Cantelmo O Spontaneous Rupture of Deep Arteries in Hypertension (Sulle rotture arteriali interne spontanee negli ipertesi) *Riv. chir.* 1936 2 193

The author reports two cases of spontaneous rupture of a deep artery in obese old men of apoplectic habitus. In the first case the rupture occurred presumably in the gluteal artery at the sciatic foramen. In the second, it occurred in a small artery of the hand. Both patients recovered.

In discussing the diagnosis Cantelmo emphasizes that the possibility of such accidents should be thought of in all cases of hypertension. He states that the diagnosis is missed not because it is inherently difficult, but because the condition is not considered. The rupture is due to the traumatic effect of increased tension on a structurally weakened arterial wall, but the detailed mechanism is difficult to determine. The arterial trunks yield to internal pressure less easily than the smaller arteries unless parietitis is present, hence they usually do not rupture in essential hypertension. When the arteries are normal in essential hypertension capillary hemorrhage is more common. However hypertension alone, without a sudden additional rise, can cause the rupture of arteries that are weakened. Mycotic aneurysms are infrequent. Regional sclerosis and anatomical structures such as foramina which may produce local pressure on the vessel wall are the most important immediate causes. The veins are not involved unless they become thrombosed by the pressure of the hematoma.

M C Morse M D

Lindenbaum, I, and Kapitza, L. The Clinical Picture and Pathological Histology of Buerger's Thrombo-Angiitis Obliterans (Zur Klinik und pathologischen Histologie der Buergerischen Form der Thrombo-angiitis obliterans) *Arch f. klin. Chir.* 1936, 184 413

The authors describe the clinical and histological picture of Buerger's disease on the basis of twenty-two cases. After reviewing the methods used in their study, they discuss in detail the signs of the disease (phlebitis migrans, changes in the pulsations of the peripheral arteries of the foot, changes in the temperature of the skin of the affected extremity), Hesse's chilling test, the index of Brown, and the symptoms of Goldilammi and Samuels.

On the basis of their findings they suggest a new division of the condition (the division made by Buerger is rejected as unsatisfactory) into three stages. Stage 1, phlebitis migrans without symptoms or with only insignificant symptoms in the

arteries. Stage 2, phlebitis migrans with very pronounced symptoms in the arteries, and Stage 3, phlebitis migrans with extensive thrombus formation in the peripheral arteries.

Sympathectomy is indicated only in Stage 2. In Stage 1 the disease is frequently unrecognized, being considered and treated as varicosities, periarthritis, thrombophlebitis, or podagra.

A detailed description of the histological pictures is given. These always show edema, swelling, a raveled appearance of the muscle fibers of the walls of the blood vessels and evidences of inflammation and granulation. In agreement with Roessle, the authors regard these phenomena as allergic changes.

In conclusion they state that the prognosis should be extremely guarded as gangrene may develop in any stage. A properly timed sympathectomy gives the best results.

(STEGEMANN) JOHN W BRENNAN M D

Kruetzberg T Experiences With Regard to the Occurrence and Treatment of Hemangiomas (Erfahrungen im Auftreten und in der Behandlung von Haemangiomen) 1935 Freiburg: Br. Dissertation

Hemangiomas are benign tumors. Nevertheless they must be given serious consideration because of their location, their occasionally rapid growth, and the possibility of hemorrhage or infection. They are common neoplasms, constituting according to Kohnmann, from 2 to 3 per cent of all tumors and about 7 per cent of all benign tumors.

The author reviews eighty cases which were treated in the last fifteen years at the Surgical Clinic in Freiburg. The great majority of the patients were children. Sixty per cent were females. Half of the angiomas were present at birth, and nearly all of the others appeared during the first month after birth. In only three cases did the neoplasm develop later than the first month. The most common locations of the hemangiomas were the skin and subcutaneous tissue. In five cases the tumor developed in muscle, and in one case, in the liver. The part of the body in which the neoplasms occurred most frequently was the head. Histological investigation showed that the incidence of the simplex and the cavernous types was about the same. All of the tumors showed a certain autonomy and independence of the growth of the body. The neoplasms damaged the surrounding tissues by infiltrating them, but never formed metastases. Spontaneous regression was not observed.

Fourteen of the children were treated conservatively by the injection of alcohol, the application of carbon dioxide snow, or roentgen irradiation, and 85 per cent by operation. Tables and case histories

included in the article show that operative treatment has the widest range of indications and yields the best prognosis as regards rapid healing and the prevention of recurrences. The author concludes that only hemangiomas which are not suitable for operation because of their location and size should be treated conservatively.

(HEINEMAN GRUEBER) WILLIAM C. BECK, M.D.

BLOOD TRANSFUSION

Overgaard K. A Case of Osteosclerotic Anemia (Ein Fall von osteosclerotische Anämie) *Acta radiol.* 1936 17 51

The author reports a case of osteosclerotic anemia and describes the bony changes revealed by roentgen examination in that condition.

The case was that of a forty one year old woman with a negative family history who was first seen in 1932. In 1925 the patient was treated for lack of blood, pallor and tiredness and was relieved by iron therapy. Six months previously she had had tinnitus and palpitation especially marked on movement and pronounced tiredness. A diagnosis of anemia of a pernicious type was made but liver therapy failed to give relief. Examination of the blood revealed a severe anemia and leucopenia. The hemoglobin was 26 per cent, the erythrocyte count 1,300,000 and the leucocyte count 2,870. The erythrocytes showed a very pronounced anisocytosis and poikilocytosis. The spleen was markedly enlarged. In the belief that the condition was an aleukemic myelosis roentgen therapy was given. This was followed by a reduction of the leucocytes to 700. Iron, various liver preparations, arsenic and milk injections were without effect on the blood picture. Following a blood transfusion the hemoglobin increased markedly and the size of the spleen diminished considerably. Two additional roentgen treatments failed to cause improvement. Roentgenography of most of the bones revealed a more or less general sclerosis of the skeletal system.

Sclerotic bone changes have been observed in various blood diseases such as myeloid and lymphoid leukemias and aleukemic leukemias, anemias and certain atypical blood conditions. The roentgen findings in the author's case were like those observed heretofore. The outer form of all of the bones was normal. The cortex was not thickened. The changes were found almost exclusively in the spongy tissue where the normally fine reticulated markings appeared very coarse and somewhat blurred. The changes were especially pronounced in the ribs, vertebrae, pelvis, skull, and epiphyses of the long bones and less marked in the diaphyses of the long bones.

The changes must be differentiated from those which are observed in marble bones, erythroblastic and sickle cell anemia, spindle cell osteosclerotic deformity of the long bones, Paget's osteitis deformans, fuorosis and osteoblastic carcinoma.

LOUIS NEWELL M.D.

Watt, W. L. Leukemia and Deep X Ray Therapy *Guy's Hosp. Rep.*, Lond., 1936 86 175

Of the cases of leukemia treated at Guy's Hospital, London, up to the end of 1926 and reported by the author in 1927 the average duration of life was eight months in those of the myelocytic type of the condition and four and four tenths months in those of the lymphocytic type. The treatment consisted principally of the administration of drugs and ordinary x ray irradiation.

Of 141 cases reported in this article 89 were of the myelocytic type and 56 of the lymphocytic type. When deep x ray therapy was used after ordinary x ray irradiation or other treatment, the average duration of life was quadrupled in cases of the myelocytic type and more than quadrupled in cases of the lymphocytic type. As the 2 groups of patients were nearly equal in number and their conditions of life were similar, the results attest the value of the more recently used method.

Deep x ray therapy not only prolongs life but in many cases causes rapid improvement. The patients soon become well and able to carry on their usual work. The periods of remission vary from three to fifteen months. As a rule it is necessary to give short courses of irradiation every three or four months. Patients who have previously received ordinary x ray irradiation or treatment with arsenobenzol apparently respond as well to deep x ray therapy as those without such previous treatment.

Splenectomy has apparently no permanent effect. After this operation irradiation of the long bones appears to act as well as irradiation of the spleen. The author states that in his opinion the phagocytic power of the polymorphonuclear cells is of considerable importance in the treatment. If the index is low or has disappeared only very short irradiation should be given at intervals of two or three days. The importance of general medical treatment cannot be emphasized too strongly. Transfusions prolong life in some cases and are useless in others.

HERBERT F. THURSTON, M.D.

Petroff J. and Bogomolova L. Experimental Studies on the Nature of Hemolytic Shock in Blood Transfusion I. The Toxic Influence of the Various Elements of Heterogeneous Blood on the Animal Organism (Experimentelle Untersuchungen ueber das Wesen des haemolytischen Schocks bei Bluttransfusion V. Mitt. Ueber die toxische Wirkung der verschiedenen Bestandteile heterogenen Blutes auf den Versuchorganismus) *Arch. f. klin. Chir.*, 1936 184 532

In order to obtain a more accurate and detailed knowledge regarding the toxic effect produced on the cardiac and vascular system (decrease of the blood pressure and of the strength of cardiac action with simultaneous diminution of the renal output) by the transfusion of heterogeneous blood the different elements of the blood were injected separately into rabbits, dogs and cats.

The authors report the results in detail with the aid of curves and tables. The findings show that the toxic effect of heterogenous blood is related to the blood proteins. It was observed that the introduction of either erythrocytes or plasma into the blood stream of the experimental animals was followed by especially marked toxic effects, whereas the introduction of the other elements of the blood (stroma, serum, and wash fluid of the erythrocytes) caused only a slight toxic effect or none at all. It was found also that the toxic effect of the plasma was less than that of the erythrocytes. Nevertheless, a markedly toxic effect was produced by the transfusion of plasma denatured by distilled water. Other experiments showed that the toxic substances are similar to the complicated protein components of adenosine phosphoric acid.

These detailed experiments therefore demonstrated that the toxic effect of heterogenous blood is due to the blood proteins and may develop independently of hemolysis.

(H. STEGEMANN) LOUIS NEUWELT, M.D.

Ujima, W. The Nature of Hemolytic Shock in Blood Transfusion. VI. The Effect of Heteroplasma and Hetero Erythrocytes on Renal Function in Experimental Animals (Ueber das Wesen des hämolytischen Schocks bei der Bluttransfusion. VI. Ueber die Wirkung des Heteroplasmas und der Heteroerythrocyten auf die Nierenfunktion beim Versuchstier). *Arch f. klin. Chir.*, 1936, 184, 536.

In an attempt to prove the theory that the renal injury, which is associated with hemolytic shock after blood transfusion and is manifested by an increase of residual nitrogen and a decrease in the quantity of urine is not due entirely to spasm of the vessels, the author administered heterogenous blood

(human erythrocytes and plasma separately) to dogs.

He reports the results by means of tables and arrives at the following conclusion:

The albumins which are freed during hemolysis and their products of disintegration are the cause of the renal injury. The erythrocytes and plasma are equally harmful when the quantities introduced contain an equal amount of albumin.

(H. STEGEMANN) CLARENCE C. REED, M.D.

LYMPH GLANDS AND LYMPHATIC VESSELS

Cattabeni, G. M. Lymphoglandular Neoplasms of Uncertain Classification. A Contribution to the Knowledge of Reticulohistocytic Tumors (Neoplasie linfoglandolari di incerta classificazione. Contributo alla conoscenza dei tumori reticolohistiocitari). *Tumori*, 1936, 22, 133.

The author reports in detail twelve cases of primary neoplasms of lymph glands and reviews present day knowledge regarding primary malignant tumors of lymph gland tissue with special reference to the neoplasms of reticulohistocytic origin. He proposes the following classification of the histiocytomas:

Sarcomatoid those with very little but quite distinct stroma, few polymorphic compact elements, and distinct cytoplasmatic outlines.

Syncytial those with more abundant stroma and showing syncytial cords and bands.

Reticular those with a well developed cellular reticulum rich in fibers forming a lattice work.

Endothelioid those with elements reproducing the structure of true endotheliomas.

CARLOS S. SCLERDI, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE, POSTOPERATIVE TREATMENT

Brock R C Postoperative Chest Complications
A Clinical Study *Guy's Hosp Rep* Lond 1936
26 191

The author reviews the literature on postoperative chest complications and reports on eighty-five cases which he studied in the wards of Guy's Hospital London

Of the general factors that may be related to the incidence of such complications he discusses the type and site of the operation, sepsis, the time of the year, pre-existing respiratory infection and the type of anaesthesia

The type and site of the operation In seventy-six of the author's cases the complications followed an operation for the repair of a hernia, in two, a tooth extraction, in one tonsillectomy, in one laryngofissure, in one antrum operation, in one, thyroidectomy, in one manipulation of fractured humerus, in one exploration of a knee joint, and in one capsulotomy of the shoulder

Sepsis Sixty-two of the author's patients were males

Sepsis Sepsis occurred in nineteen of the cases. *The time of year* Inclement weather and other atmospheric or seasonal conditions had no influence on the author's patients

Pre-existing respiratory infection Acute subacute or chronic pre-existing respiratory infection is always associated with great risk of precipitating an acute pulmonary lesion

The type of anaesthetic employed It has long been assumed that an inhalation anaesthetic increases the liability of postoperative chest infection. However, the author's statistics as well as the statistics of others show that the incidence of such infection is equally high after the use of a spinal or local anaesthetic

Brock emphasizes that the incidence of chest complications following operations usually depends on a combination of several circumstances and rarely on one factor alone

Postoperative chest complications are of the following types

Bronchitis A certain number of patients develop a simple productive cough with fever but with no abnormal signs in the chest except a few rales. Resolution occurs in a short time leaving no evidence of severe or permanent damage

Atelectasis In its most typical form atelectasis comes on usually within from twenty-four to thirty-six hours after operation. Rarely it appears as late as in the second week. The onset may be abrupt, with pain and distress and a rapid increase in the

temperature and pulse rate. The symptoms vary. Difficulty in breathing is usually marked. Occasionally there is cyanosis of the lips. Very often the patient lies back in fatigue with an anxious expression on his face which is flushed and perspiring. Pain may be present in the chest. A sign which the author regards as of great importance is a peculiar and typical cough described by him as "fruity." This is due to the retention of thick mucopurulent material in the trachea and large bronchi. The patient is, as it were, 'gargling' it in his trachea, afraid to give the adequate cough that will expel it because of the pain the cough will cause in the wound. Physical examination of the chest reveals that the involvement is on the side on which the abdominal operation was performed. The heart is displaced toward the side of lesion. On the affected side movement is decreased and the percussion note is impaired. At times there may be absolute dullness. Auscultation reveals patchy rales or complete absence of respiratory sounds. Bronchial breathing may be heard in one place and silence noted in another. Of first importance in the diagnosis are roentgenograms of the chest. The chief findings of roentgenographic examination are (1) an area of opacity either basal, strictly lobar, or massive, (2) displacement of the mediastinal structures, the heart, and the trachea, (3) crowding together of the ribs and narrowing of the intercostal spaces producing a 'roof tile' appearance, (4) elevation of the diaphragm, (5) reduction of one half of the chest as compared with the other half, and (6) predominance of these changes on one side but often lesser and quite definite patchy changes on the other side. The sputum is thick, viscid and mucopurulent and so tenacious that it will not run when held upside down in an open dish or a test tube

The causes of postoperative atelectasis are varied. No one factor is alone responsible. Several factors act together with different degrees of importance at different times giving rise to corresponding differences in the clinical illness and the pathological conditions. Bronchial obstruction is regarded as a primary cause. In two cases the author found mucous plugs in the main bronchi of atelectatic areas at postmortem examination

Different forms of postoperative atelectasis may occur. One variety may aptly be described as massive collapse. Insufficiently appreciated is the frequency of the bilateral occurrence of the condition. A purely lobar collapse is relatively uncommon. A partial lobar collapse is seen when one sub-division of a secondary bronchus is obstructed. A type less widely recognized is described by the author as the 'drowned' lung. In this type the infection of the bronchi probably of the smaller

bronchi, is more severe and is productive of more exudate as stagnation is more complete. The symptoms are severe, and distress is sometimes extreme. On auscultation, a large area of one lung is found completely silent except for a few moist sounds. This type is especially liable to proceed to true bronchopneumonia or what is known by the American term "pneumonitis."

In most cases of postoperative atelectasis recovery occurs quickly, either spontaneously or as the result of quite simple treatment. The treatment can be conveniently divided into the prophylactic and the active. Prophylaxis includes (1) the avoidance of operation during or soon after an acute respiratory infection, (2) the avoidance of an irritant inhalation anesthetic when possible, (3) the use of an incision in the abdominal wall that is as atraumatic as possible and causes the least after pain, (4) the avoidance of constricting bandages or splints and of excessive hypnotics and belladonna, all of which promote stagnation of secretions, and (5) the prophylactic use of inhalations of carbon dioxide. The aim of active treatment of the established condition is to assist bronchial drainage. Changing the posture of the patient by turning him from side to side several times daily is very effective. When expectoration is not easy a few inhalations of carbon dioxide will often stimulate. Slapping or bandaging of the chest and bronchoscopic aspiration are practically never necessary. Potassium iodide is of value.

Pneumonic conditions. True lobar pneumonia is a rare sequel to operation. It developed in only one of the author's eighty-five cases.

Lung abscess. There is strong evidence that postoperative lung abscesses are due usually to the inhalation of infected material and not to embolism. The clinical course in most cases is quite characteristic. The onset is often delayed for as long as two weeks. Lung abscess developed in twenty of the author's cases and was fatal in twelve.

Empyema. Of all the chest complications that may follow operation, empyema is perhaps the one most commonly undiagnosed and for that reason often the most tragic. This condition occurred in five of the reviewed cases and was fatal in three. The possibility of empyema must always be kept in mind, and every effort should be made to exclude it. The only sure method of proving its presence or absence is the use of the aspirating needle.

Subphrenic abscess. Subphrenic abscess is always a serious condition with a high mortality. There are two reasons for this: the abscess most commonly complicates an advanced or neglected abdominal condition such as a late perforated peptic ulcer, and the infection is liable to spread through the diaphragm and produce additional lesions in the chest. The diagnosis is even more often missed than that of empyema. It should be a surgical dictum that if a patient has had an abdominal operation, particularly if the latter was associated with infection, and if anomalous signs develop at the base of one lung, the presence of a subphrenic abscess should be

assumed until every possible step has been taken to exclude it and it has been definitely ruled out.

Phthisis. After operation, as under other circumstances, tuberculosis may appear in many guises. Therefore the possibility of its presence should always be kept in mind in the examination of patients with an obscure postoperative condition.

Pulmonary embolus. The diagnosis of pulmonary embolus should be relatively easy as the symptoms and signs are usually characteristic. There is sudden pain in the chest with dyspnea, collapse, and a pleural rub, and later the development of a clear effusion. The presence of blood in the sputum confirms the diagnosis. J. DANIEL WILLEMS, M.D.

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

Meleney, F. L. Zinc Peroxide in Surgical Infections. *Surg. Clin. North Am.*, 1936, 26, 691.

Zinc peroxide is an amorphous powder having the appearance of chalk. It is not obtained in a chemically pure state as it occurs in combination with zinc hydride and zinc carbonate. It is insoluble in water, forming a white sediment at the bottom of the container. However, within an hour bubbles of oxygen appear in the sediment. The sediment then becomes flocculent, and a curdlike mass appears in the watery suspension. These are the characteristics of a clinically effective zinc peroxide preparation.

In the treatment of surgical infections, zinc peroxide is superior to other oxygen producing preparations because its oxygen is delivered to the tissues over a longer period of time than that, for example, of hydrogen peroxide and potassium permanganate, and it has no destructive effect on the tissues.

The author recommends that all wounds be subjected to a complete bacteriological study (aerobic and anaerobic cultures) for identification of the pathogenic organisms before zinc peroxide is used. He classifies surgical infections into three general groups: (1) those in which incision and drainage enable the body to rid itself of the pathogenic organism; (2) those in which, in spite of adequate drainage, healing occurs slowly; and (3) those which are in no way controlled by incision and drainage and continue to spread.

Four cases of the second group are reported. The most interesting was a case of progressive bacterial synergistic gangrene of the chest wall following drainage for a lung abscess. The patient had been operated on six months previously for empyema by the closed drainage method. Two weeks after the operation the tube came out but was replaced and anchored by suture under local anesthesia. A week later, an area of purplish gangrene developed. This progressed rapidly for ten weeks and failed to respond to antiseptics. When the patient was first seen by the author, in the twelfth postoperative week, there was an ulcer measuring 12 by 15 cm. about the site of the tube. This was surrounded by

a 3 cm zone of purplish gangrene. The latter was encompassed by an indurated purplish non gangrenous zone which in turn was surrounded by a red inflamed area of skin from 1 to 4 cm wide. Anaerobic culture of the advancing zone revealed the non hemolytic micro aerophilic streptococcus. Cultures taken from the gangrenous area yielded both this organism and the hemolytic staphylococcus aureus. The entire involved area was excised well into normal skin. Better drainage for the abscess was provided by resection of a portion of the eighth rib. The new wound was covered with the curd like mass of zinc peroxide suspended in water and over this was applied gauze soaked in watery zinc peroxide. The whole area was then sealed with a layer of gauze treated with zinc-oxide ointment. Frequent dressings of this type resulted in a clean wound with a fresh granulated surface. On the tenth post operative day 700 pinch grafts, which subsequently closed the wound were transplanted. Follow up cultures were negative for the non hemolytic micro aerophilic streptococcus.

Of the third group two cases are of special interest. The first was that of a girl who was operated on for appendicitis after the subsidence of an acute attack of that condition. The incision was closed without drainage but re opening of the wound soon became necessary because of pus. Active drainage continued for several weeks. At the end of that time sloughing of the subcutaneous fat and rarefaction of the skin occurred. These processes were unaffected by antiseptics or conservative surgery. Ultimately they extended upward to the umbilicus laterally to the flank and distally to the vulva and groin. Fifteen months after the appendectomy the patient came under the authors treatment with the history of a daily fever of from 101 to 103 degrees F. Under anaerobic conditions the micro aerophilic hemolytic streptococcus was cultured from the wound. Following wide and complete excision of the ulcer hearing area down to the muscular fascia the wound was completely flooded with zinc peroxide suspension and sealed with zinc oxide ointment. The dressings were changed daily for two weeks. Zinc peroxide was the only chemical agent used. Skin grafts were transplanted to the healthy granulating wound surface from the thighs.

The second case of special interest in the third group was that of a patient who developed gas infection of the thigh after hypodermoclysis and hypodermic medication. The origin of the infection was probably contamination from a functioning cecostomy performed for carcinoma of the recto sigmoid colon. Cultures yielded the Welch bacillus. The gas infection involved the vastus externus and the rectus femoris muscles. The involved area was opened widely and the necrotic portions of the muscle were removed. The wound was then treated with zinc peroxide dressings and three therapeutic doses of anti gas serum were given intravenously at intervals of eight hours. Under this treatment the gas infection was rapidly overcome.

Zinc peroxide in conjunction with surgery has been used successfully also for the treatment of acute emphysematous cellulitis of the dorsum of the hand, abscess of the cheek following a dental infection inguinal suppurative lymphadenitis, ulcerative vaginitis, and pelvic abscess.

BENJAMIN G P SHAPIROFF M D

ANESTHESIA

Ehrenpreis T. Avertin Anesthesia in Children
III Avertin in Tetanus (Die Avertinarkose bei Kindern. III Avertin bei Tetanus). *Aord med Tidsskr* 1935 p 2094

In a review of the literature the author found the records of sixty six cases of tetanus in which avertin anesthesia was employed as a curative measure. In this article he reports in detail the first case in which avertin was used therapeutically in Sweden. The patient was a five year old boy. Anesthesia was induced twelve times with a total of 23.4 gm of avertin. In addition 136,000 units of tetanus antitoxin were given intravenously or intramuscularly and twice, 1,100 units were administered intraspinally. Recovery resulted. The effect of each anesthesia was about the same. To prevent serum exanthem calcium was given intramuscularly with good results.

In conclusion the author discusses the previously reported cases in which avertin anesthesia was employed.

In an article published by Anschuetz in 1930 a review of the literature is presented. A table based thereon shows that of twenty seven patients nineteen recovered. Most of the reports were from the German literature. In all of fifteen cases reported since 1930, fourteen of which were recorded in the German literature, recovery resulted under treatment by the daily induction of avertin anesthesia.

(GERLACH) LEO A. JUECKE, M D

Flandin C, Joly F, Bernard J and Turiaf J.
A Clinical Anatomopathological and Experimental Study of the Intoxications Produced by the Barbituric Anesthetics Exclusive of the Effects upon the Nervous System (Etude clinique anatomopathologique et expérimentale des intoxications par les anesthésiques barbituriques système nerveux excepté). *Anes et Anal* 1936 2 72

The rapid or irregular respiratory rhythm so frequently noted in fatal barbiturate intoxication may be due entirely to the effects of the drug upon the central nervous system. Under such conditions autopsy findings in the lungs will be entirely negative. The frequent acute pulmonary edema or diffuse congestion of the lungs which is particularly marked at the bases of the lungs, is probably the result of circulatory disturbances. In the lungs of the comatose patient who is suffering from barbiturate intoxication there may be small or extensive areas of atelectasis due to reduction of the respira-

tory excursions Atelectatic areas seem to be found most commonly in the right lower lobe Pneumonia is apt to develop as a complication from exposure to cold, gastric lavage, or imprudent attempts at feeding by mouth The discovery of râles, bronchial breathing, or a diminution in the respiratory murmur will aid in the clinical interpretation of the condition in the lungs

Although research in toxicology has shown that the barbiturates are excreted by way of the kidneys, they seem to have little affinity for the renal parenchyma Hence, in acute intoxication, kidney complications are comparatively rare Early, there may be diuresis, while later, the urinary output becomes diminished

Despite the unanimity of opinion that the destruction of the barbiturates takes place in the liver, the authors have never found liver tenderness, increased bile pigment in the blood or urine, hepatomegaly, or icterus in their cases Others, however, have reported the discovery of important parenchymatous lesions in the liver

Circulatory accidents are quite uncommon and usually due to the effect of the drug on the nervous system Individual susceptibility, which is responsible for occasional severe reactions, cannot be measured or prevented

Changes in the blood have frequently been reported, but the findings are extremely varied There appears to be no change in the bleeding time, and the effects upon the coagulation time are variable The majority of investigators agree that the blood count remains unchanged The chemical character of the blood seems to be practically unchanged

Cutaneous symptoms are frequent They may appear soon after the administration of the drug

or much later The various types are erythema, morbilliform and scarlatiniform eruptions, urticaria, vesicles, bullae, ulcerations, and purpura

The authors report three experiments which they carried out on animals In the first experiment guinea pigs were given intraperitoneal injections of from 1 to 2 c cm of evipan sodium thirty times during the period from August 21 to October 3 The anesthesia was complete each time and lasted for from twenty five to forty five minutes The authors describe the pathological findings in the liver, kidneys, spleen, and suprarenals in detail

In the second experiment, guinea pigs were given thirty intramuscular injections of the same solution Red cell counts, which were made in the cases of these animals, showed a considerable degree of anemia at the end of the experiment The other findings were essentially the same as those in the first experiment

In the third experiment, guinea pigs and rabbits were given soneryl This was injected intraperitoneally and intramuscularly into the guinea pigs and intravenously into the rabbits

In conclusion the authors state that the barbiturate anesthetics have an elective action upon the central nervous system In barbiturate intoxication cutaneous symptoms are frequent, and complications in the lungs are more common than complications in other organs

Because of the differences in the susceptibility of patients, they believe that the use of a standard dose per kilogram of body weight is not good practice They urge very slow injection of the drug with immediate use of strychnine as an antidote if untoward symptoms appear

MARSH W POOLE M D

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Christensen H Physiological and Physical Considerations Regarding the Value of Fluoroscopic Copy (*Einige physiologische und physikalische Betrachtungen ueber die Leistungsfähigkeit der Durchleuchtung*) *tota radiol* 1936 17 169

The author states that fluoroscopy must be regarded as presenting a series of closely related problems with physical physiological and psycho technical components. He discusses the power of distinction and visual acuity especially in relation to the reduced brightness during the examination which may be as low as 0.001 lux. the importance of scattering in the contrast and the means of reducing scattering. The preferred methods for the reduction of scattering are the use of the Bucky diaphragm and the intercalation of a specific object screen distance. On physiological grounds Christensen emphasizes that the field chosen must not be too small. He states that the unfavorable conditions encountered by the eye during fluoroscopic examination continue to give rise to uncertainty with regard to the findings. The procedure requires considerable improvement.

De Fine Licht E Screening as Compared with Roentgenography in Lung Examination *Acta radiol* 1936 17 105

On the basis of the literature and his own studies the author declares himself in agreement with those who believe that even considerable pathological changes in the lungs are apt to be overlooked in fluoroscopic examination. On the basis of purely ophthalmological grounds the earlier researches of Stumpf and others, and his own experiments, he has come to the conclusion that screening errors are due to reduction of dark vision in which reduction of the power of distinction plays an important part and reduction of the visual power only a minor part. He believes that all patients with symptoms of a pulmonary affection should be examined by roentgenography and that fluoroscopy should be used only in mass examinations and in these with great care.

Chaoul H, Morison, J M W, Bromley J F Discussion on Short Distance Low Voltage X Ray Therapy *Proc Roy Soc Med Lond* 1936, 29 791

CHAUL states that low voltage roentgen irradiation is concentrated upon a field usually about 1 in in diameter and is brought within 2 in. of the tissue to be treated. This method was developed as the result of a comparison of the action of radium with that of the roentgen rays. Chaoul's working hypothesis was that the frequently observed superiority

of radium over the roentgen rays is due not to the quality of the rays, but to the physical properties and the conditions of their application. On the basis of this hypothesis there was good reason to believe that results similar to those obtained with radium would be obtainable with the roentgen rays if the latter were applied under similar conditions as regards dose distribution through space, the time factor and the total dose administered.

The features of Chaoul's technique are summarized briefly as follows:

- 1 A short focus skin distance (normally 2 in.)
- 2 Low voltage roentgen rays (60 kv.)
- 3 Little filtration (total 0.2 mm of copper)
- 4 Localization by an applicator to protect normal surrounding tissue (fields not exceeding 4 sq in.)
- 5 Fractional dosage by time spacing (total treatment time from two to four weeks)
- 6 Concentrated daily doses (from 300 to 500 r administered in from two to four minutes)
- 7 A large total dose (from 5,000 to 10,000 r administered in from two to four weeks)

So far as they depend upon the equipment all of these requirements are met by the use of an x ray tube of unusual design in which the focus is situated at the extremity of a long metal tube. By this means it is possible to obtain the desired geometrical dose distribution if the conditions of application mentioned are observed.

The depth dose distribution resulting from this method of irradiation is shown by a diagram and photographs. A rapid decline of the intensity with the depth is apparent. The aim of the method is to administer a high dose to the tumor sparing the surrounding unaffected tissue so that it may assist in the general cure.

The new treatment can be applied not only to early growths but also to ulcerated and infiltrating tumors which cannot be treated in any other way. Recently it has been extended to the treatment of deep tumors rendered accessible by operative means.

Up to the end of 1935, 231 cases were treated by the new method with the time of observation extending up to four years. In 81 per cent of the cases absolute freedom from symptoms has been attained. The types of lesions and the incidence of completely successful results in each were: 109 skin carcinomas 93.5 per cent, 26 carcinomas of the lip, 88.5 per cent, 28 carcinomas of the oral cavity, 53.6 per cent, 45 carcinomas of glandular organs and the rectum 61.4 per cent, 12 melanohlastomas 83.3 per cent and 11 sarcomas 63.6 per cent.

The results show that, for lesions of these types, the new treatment is a good deal more useful than

ordinary deep therapy, which in many cases of such lesions would fail

Even though such cases can often be treated equally well with radium, economic considerations based on the limitation of the amount and the high cost of available radium render radium therapy impracticable. By low voltage short distance therapy all suitable cases can be treated at low cost

MORISON discusses the subject in a general way from the technical and clinical standpoints, giving detailed information relative to particular aspects of the method. He states that the results obtained at the Cancer Hospital were very similar to those obtained by Chaoul, whose technique was followed closely. The lesions so far treated were epitheliomas of the lip, floor of the mouth, alveolus, tongue, cheek, palate, tonsils, and pharynx, recurrent nodules in cancer of the breast, cancer of the rectum after operation, and other cancers that were accessible or were made accessible by operation. While the problem of metastases still remains, it cannot be completely solved by any form of irradiation treatment

BROMLEY presents a brief review of the history of low voltage and other forms of x ray treatment up to the time of what he calls the "contact therapy," advocated by Chaoul. He quotes statements made by Morison, Hugo, and Mayneord which present the fundamental principles on which this method of treatment rests, as follows

1 There is no difference between the clinical effects of the same dose of x irradiations of different wave lengths. The important factors are the energy absorbed per cubic centimeter and the time spacing of the doses

2 The distribution of irradiation in the tissues with a small focus skin distance is similar to that obtained with radium surface applicators and bombs. The high dosage rates available from x ray apparatus make possible the treatment of a large number of patients in a short time with a smaller financial outlay than with the use of equivalent radium

3 The healthy surrounding tissues should be spared as much as possible in order to expedite and aid subsequent repair

4 The difference of dosage rate is of little or no importance provided the proper time spacing of fractions is maintained

Bromley discusses each of these statements at length

Calling attention to the well known fact that many local malignant lesions are not strictly localized, he emphasizes that all lymphatic areas connected with a malignant focus should be irradiated as heavily as possible. He believes that the damage to healthy tissues involved in heavy high voltage irradiation is not so severe from the point of view of metastases as might be imagined

An important feature of the Chaoul tube and method is their convenience in the treatment of localized concave ulcerous tumors or localized ex-

crecences in awkward situations such as the pinna, the external auditory meatus, the canthus of the eye, the ala of the nose, and the angle of the mouth. The new method has considerable advantages over the use of the radium applicator and distant roentgen irradiation. The source of the irradiation can be applied practically directly to the tumor and is controlled with ease in the treatment of lesions situated where a widespread reaction is not desired, such, for example, as tumors of the canthus

Seventy cases treated by Bromley by the short-distance low voltage method are tabulated. The lesions included 17 epitheliomas, 40 rodent ulcers, 6 breast carcinomas, and 7 miscellaneous lesions. In 22 cases the lesion was healed, in 37, it was improved, in 9, it became worse, and in 1 case each death resulted from cancer and another cause

Bromley's conclusions are summarized briefly as follows

The method of contact therapy is a valuable addition to the radiologist's armamentarium. Its great advantage is its convenience. The source of the rays can be placed in direct contact with the lesion, and the beam of rays is easily controlled. The method will be a most valuable aid in research, especially if the apparatus is made still more mobile and easier of manipulation in cavities than it is at present. It does not replace high voltage irradiation and does not relieve the radiologist of the necessity of giving the same thought to extensions to glandular and other areas that he has given them heretofore. With advances in the technique, it may to some extent replace radium irradiation in the mouth, but when one reflects on the ease and reasonable certainty with which combined radium and high voltage x rays can be used for the treatment of cancer of the uterine cervix, one hesitates to prophesy that the latter method of treatment, if available, will be seriously threatened by any other form of irradiation therapy. ADOLPH HARTUNG, M.D.

RADIUM

Simpson, B. T., and Reinhard, M. C. Advantages and Disadvantages of Radium Packs. *Am J Roentgenol*, 1936, 35, 513

While irradiation with the 4 gm. radium pack is of definite value for certain lesions, it is inadequate for others. In the treatment of lesions measuring less than 10 by 10 cm. a considerable amount of healthy tissue is irradiated. The authors found it necessary to supplement the 4 gm. pack by the use of auxiliary packs of small size. Another disadvantage of the pack is due to the fact that the depth intensity of gamma rays does not increase with the increased treatment area as does the depth intensity of x rays with ordinary filtration. In irradiation with the 4 gm. pack the authors experienced difficulty in using more than two posterior and two anterior portals over the pelvis at a distance of 10 cm. when a distance of 5 cm. was maintained between the portals and the angle did not exceed 15 degrees.

At a mid point of pelvis with an anteroposterior dimension of 20 cm this technique yielded a depth intensity of 63 per cent. The authors experienced further difficulty from the upright position of the radium tubes within the pack and from the distribution of the radium containers in the form of a hollow square. The perpendicular position of the tubes reduced the depth dosage by 20 per cent. These and other difficulties resulted in the development of highly specialized packs, chief of which is the three section pack. This pack is described in detail as regards contents, angle, filter, and depth dosages.

The authors have used the three section pack for eight months in the treatment of malignancies of the bladder, rectum and uterus with gratifying results. From 400 to 500 r are given per day per field over a period of from eighteen to seventy five days the application being made alternately to anterior and posterior surfaces. The lesions selected for purely external irradiation were those found by experience not to respond to other forms of irradiation. If complete disappearance of the lesion was not obtained by external irradiation the remnants were treated by interstitial irradiation. Some advanced lesions were caused to disappear completely as far as could be determined by clinical and histological examination. Three cases with such a result are reported.

The chief disadvantages of the use of the ordinary 4 gm. pack, aside from its expense are its inflexibility, the time required, and the fact that for such a strenuous form of treatment the patient must be in fairly good physical condition. When the multiple pack is employed the depth dose at 10 cm. is double that yielded by the 4 gm. pack at a distance of 10 cm. from the skin.

In conclusion the authors state that with the use of specialized packs it is possible to obtain results which cannot be obtained with any other form of irradiation.

A. JAMES LARKIN M.D.

MISCELLANEOUS

Terry G. C. Notes and Impressions from Recent Literature on Fever Therapy. *Bull. Neurol.* Inst. New York 1936 4: 707.

The malarial treatment of paresis by Wagner-Jauregg in 1918 was the first outstanding example of the clinical use of fever. Recent work in the field of pyrotherapy has demonstrated that in certain diseases the results of the treatment are the same regardless of the method employed to induce

the fever, providing the optimum febrile dosage is given. Investigators have attempted to demonstrate that fever exerts an adverse influence on the growth of bacteria, diminishes the potency of toxins, favors phagocytosis, and stimulates the formation of immune bodies. Certain studies suggest also that it stimulates metabolism and more adequate functioning of the somatic and sympathetic nervous systems.

The diseases which show most interesting and encouraging reactions to fever therapy are those which ordinarily are not self limited and not accompanied by a rise in the temperature. In acute self limiting pathological conditions there is generally a rise in the temperature and recovery occurs with the return of the temperature to normal.

Among the chronic afebrile diseases in which encouraging results from pyrotherapy have been obtained are bronchial asthma, chronic non specific atrophic infectious arthritis, chorea with and without carditis and multiple sclerosis. This type of treatment has been used also in encephalitis and schizophrenia, but the number of cases is too small to permit definite conclusions regarding its effect in these conditions.

In the opinion of the author, pyrotherapy is best administered by means of the electrically heated and humidified cabinet. In the use of this method the induction of fever is controllable and can be accurately measured as to intensity, duration, and frequency. The optimum temperature curve can be determined for each patient, and a metabolic activity more nearly approaching the normal is stimulated. In cases presenting evidence of cardiac, renal, vascular or central nervous system degeneration the treatment is contra indicated. A too rapid rise in the temperature is to be avoided. The ideal rise is 1 degree Fahrenheit every fifteen minutes after the first fifteen minutes until from 103 to 105 degrees is reached. It is considered dangerous to permit the rectal temperature to rise above 107 degrees. To prevent dehydration during the treatment the patient should be given large quantities of fluid.

At the present time definite data as to the temperature desirable or safe for different conditions, the length of time the artificial fever should be maintained, the number of treatments to be given, and the frequency of the treatments are still lacking. In the absence of uniformity in observations of the response to artificial fever production, the treatment must be carried out largely on the basis of careful individualization of cases.

ARTHUR S. W. TOUROFF M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Sorokin, F. F. The Problem of Radio Ulnar Synostosis (*Zur Frage der Synostosis radio ulnaris*) *Acta radiol.*, 1936, 17: 191

Sorokin reviews the literature and the anatomy of radio ulnar synostosis and discusses the diagnosis of the condition. He states that this developmental anomaly is often inherited, frequently symmetrical, and sometimes associated with other anomalies. The differential diagnosis can be made only by roentgenography.

Yater, W. M., and Cahill, J. A. Bilateral Gangrene of the Feet Due to Ergotamine Tartrate Used for Pruritus of Jaundice. *J. Am. M. Ass.*, 1936, 106: 1615

Ergotamin tartrate is an alkaloid of ergot. It is capable of producing serious toxic disturbances. Usually such disturbances are the result of overdosage. Chief among the ill effects that may be produced by the drug is gangrene of the extremities. The cause of the gangrene is occlusion of the medium sized and small arteries and of the arterioles by severe constriction and thrombosis. Intimal proliferation of small arteries may also play a role. The vasoconstriction is followed by hyaline degeneration of the vessels.

The drug probably should not be used in cases of febrile puerperium, cases of severe toxemia from any cause, or cases presenting evidence of functional or organic vascular disease. Unless well established indications for its use arise, it should be employed only by careful investigators who are able to keep the patients under constant observation. At the present time its use by members of the profession at large should probably be limited to appropriate obstetrical and gynecological conditions and migraine. The drug is less apt to produce toxic effects when it is given orally than when it is injected.

During its administration a close watch should be kept for toxic symptoms and signs of impairment of the peripheral circulation. If these appear the use of the drug should be discontinued immediately. Epinephrin and papaverin hydrochloride are suggested for relieving the vascular spasm.

The case reported by the authors was that of a man who had a toxemia with jaundice of unknown causation. Ergotamin tartrate was injected because of pruritus. Nineteen cubic centimeters were used within a week. Gangrene of the feet developed during this time and amputation of the legs became necessary. Study of the vessels showed that the changes were due to ergotism. The total dosage of ergotamin tartrate administered in this case was

more than should have been given by hypodermic injection. SAMUEL KATZ, M.D.

Gould, S. W., Price, A. E., and Ginsberg, H. I. Gangrene and Death Following Ergotamine Tartrate (Gynergen) Therapy. *J. Am. M. Ass.*, 1936, 106: 1631

The case reported was that of a middle aged woman who developed gangrene of both lower extremities immediately after the institution of ergotamine tartrate therapy. At autopsy, all of the arterioles examined were found to be contracted. McGrath's demonstration of the occurrence of gangrene in rats following the injection of gynergen suggests that the ergotamine tartrate might have had a similar effect. The pre-existing vascular disease apparently favored the development of the gangrene. The evidence indicates that the use of drugs of this type should be avoided in cases of vascular disease such as arteriosclerosis, Buerger's disease, coronary sclerosis, and splinted narrowing of the mouths of the coronary vessels.

SAMUEL KATZ, M.D.

Affleck, D. H. Melanomas. *Am. J. Cancer*, 1936, 27: 120

Melanomas are tumors characterized by the formation of melanin. The benign neoplasms of this type are known as "pigmented nevi" and the malignant neoplasms as "melanosarcomas," "melanocarcinomas" and "malignant melanomas."

Affleck reports a study of 215 cases of pigmented nevus and 317 cases of malignant melanoma from the standpoints of distribution, age incidence, treatment, and results. He states that benign nevi occur most frequently on exposed areas—the scalp, face, upper extremities, chest, back, and lower extremities. Malignant melanomas are slightly more common in males than in females. They are extremely rare in the colored race.

In the reviewed cases of malignant melanoma the incidence of the lesions was fairly uniform between the ages of twenty and seventy years. Only 4 of the patients were under the age of twenty. In 266 cases the malignant melanoma developed from a previously existing quiescent nevus. In no case did it arise from a hairy mole. That trauma is a factor in the production of malignant change in quiescent nevi is suggested by the most common sites of malignant melanomas, namely, the foot, leg, arm, face, and back.

The prognosis depends, not upon the histological type, but upon whether or not metastases are present at the time the malignant change is first discovered. If complete removal is effected in the early stages of the malignancy, there is a good possibility

for a fairly long arrest of the condition. It must be remembered, however, that a clinically manifest malignant mole usually represents a far advanced stage of malignancy and is therefore often hopeless. Metastasis may take place by way of the blood stream or lymphatics. In 121 of the reviewed cases it occurred by way of the lymphatics.

The most successful treatment is the removal of benign pigmented nevi, particularly those in areas subject to trauma while they are in the quiescent stage.

JOSEPH K. NARAT, M.D.

Bischoff F. and Maxwell L. C. The Effect of Sex Hormones on Transplanted Neoplasms. Am J Cancer 1936 27 87

In the experiments reported pronounced gonad stimulation by pituitary extracts and by activated prolactin as evidenced by 300 per cent increases in the weights of the ovaries and seminal vesicles failed to affect the growth of Sarcomas R 10 and 180.

Two thousand units of estrin per mouse, which caused a decrease in the weight of the seminal vesicles, did not affect the growth of Sarcoma 180.

In a preliminary study of the Simpson spontaneous mammary carcinoma it was found that prolactin in doses of 60 bird units per mouse had no appreciable effect upon tumor growth.

The results support and supplement the original contention of Bischoff and Maxwell that gonadotropic extracts and estrin do not influence the growth of transplanted tumors. They demonstrate that while these hormones may induce changes in the body such as overstimulation of the ovaries, testicles, prostate or mammary glands which may lead to the formation of neoplasms, they do not themselves directly stimulate or retard the progress of transplanted neoplasms.

JOSEPH K. NARAT, M.D.

Overgaard K. Experimental Studies of Short Wave and Ultra Short Wave Treatment of Malignant Tumors (Experimentelles ueber Kurz und ultrakurzwellentherapie boesartiger Tumoren). Acta radiol. 1936 17 181

Experiments on white mice have shown that it is possible to exert a curative influence on implanted tumors by subjecting them to short wave and ultra short wave treatment. The effect of this treatment does not differ from that of ordinary diathermy and is to be interpreted as a simple heat influence toward which the tumor tissues are less tolerant than the healthy tissues.

Payr E. Operative Cures of Cancer Lasting for Years Without Recurrence (Langjaehrige operationen Krebsheilungen ohne Kueckfall). 60 Tag d. deutsch Ges f. Chir. Berlin 1936

Payr reports the findings of a follow up study which he made with regard to recurrence and length of survival in the cases of patients whom he operated upon for cancer in the period from 1905 to 1926. A period of ten years was taken as the lower limit of safety as both rectal and mammary gland carcino-

mas recur after from six to seven years in a considerable number of cases. Of the 417 cases of cancer observed by Payr up to 1926 (exclusive of cases of skin cancer, papillomas, and pedunculated polyps), 368 were treated surgically. A radical operation was performed in 162 with death in 29. Of the surviving patients, 29 (21.8 per cent) remained free from recurrence for more than ten years; many of them for from fifteen to twenty years and 2 who were treated for cancer of the rectum remained well for thirty years. Nineteen (14 per cent) are still alive.

The cases included cancers of all internal organs: the female breast, the jaws, the thyroid gland, the penis, the testis and the urethra. In almost all of those of cancerous tumor which were operated upon the pathologico-anatomical diagnosis was made by a recognized specialist (Eppinger, Sr. Grawitz, Hanke, Marchand, Hueck). From the findings of the follow up study it is therefore apparent that a ten to thirty year period of freedom from recurrence is not extremely rare as is often assumed.

In the cases of a number of the patients who are now dead, detailed medical or autopsy reports proved or practically proved that cancer was absent in the operative field at the time of death. The statistics were best for cases of cancer of the breast, colon and rectum. It is significant that even 2 patients who were treated for cancer of the thyroid have been free from recurrence for more than ten years (fourteen and seventeen years respectively). One of them has remained well in spite of the fact that the tumor had spread through the capsule of the thyroid. The development of cancer in another organ after a long period of freedom from the disease occurred in only 1 case, that of a patient operated upon for malignancy of the jaw who developed a cancer of the bladder twelve years later.

Payr urges other surgeons who have been active in the treatment of cancer for a number of years to follow up their patients in a similar fashion. He calls attention to the fact that in the majority of cases in which a radical operation was performed before 1921 postoperative irradiation was not given. He asks that, at autopsy on bodies showing operative scars, pathologists make a careful examination for recurrences at the site of the operation and in other locations and report their findings to the clinicians. He emphasizes that, so far as is possible, clinicians should maintain contact with patients they refer to surgeons.

Sarcomas were excluded from the authors' investigation because of the difficulty in eradicating them completely, the frequency with which they necessitate mutilating operations and their great tendency to form visceral metastases early.

In conclusion Payr says that as objections to the operative treatment of cancer are becoming more and more frequent, it is important to investigate the end results in surgically treated cases to find out what really can be accomplished by operation.

(FRANZ) JACOB E. KLEIN, M.D.

Quinland, W S A Report of Three Cases of Melanosarcoma in Negroes—One with Massive Hemorrhagic Cystic Degeneration of the Liver *J Nat Med* 135, 1936, 29 49

Of the patients whose cases are reported by the author, two were females. The three tumors began in different parts of the body and ran a short course with a fatal termination. The author states that melanosaarcoma is a rare tumor and is less frequent in Negroes than in white persons. Its histogenesis is disputed, but according to the theory most widely accepted the neoplasm is of neurogenic origin. The site of the tumor may be doubtful. Its metastasis to visceral organs frequently leads to extensive hemorrhages and death.

JOSEPH K. NARAT, M D

DUCTLESS GLANDS

Long, C N H The Interrelationships of the Glands of Internal Secretion Concerned with Metabolism *Am J Med Sc*, 1936, 101 741

In a comprehensive review of the physiology of carbohydrate metabolism the author states that the diabetes of the hypophysectomized, pancreatized animal is mild and distinguished chiefly by the absence of ketosis. The adrenalectomized, depancreatized cats of Long and Lukens had diabetes of this type. Injections of pituitary extract will counteract the diabetes of hypophysectomized, depancreatized animals, but not that of adrenalectomized, depancreatized animals. Hence, in the production of the typical diabetes, the extract acts on the adrenal cortex. The ordinary cortical extract, however potent it may be in overcoming adrenal insufficiency, will not do this. It is therefore suggested that the adrenal cortex has two functions—one associated with salt metabolism and the other associated with carbohydrate metabolism.

PAUL STARR, M D

Simpson, S L, De Fremery, P, and MacBeth, A The Presence of an Excess of "Male" (Comb-Growth and Prostate Stimulating) Hormone in Virilism and Pseudohermaphroditism *Endocrinology*, 1936, 30 363

The urine of eleven women with virilism and three pseudohermaphrodites was investigated with regard to its content of male hormone and estrogenic hormone.

The amount of male hormone was determined from the effect of the urine on the growth of the combs of capons and the weight of the prostates of castrated rats. The results of the two methods were similar.

An excess of male hormone was found in the urine of four of seven women with an adrenogenital syndrome, three women with Cushing's syndrome, and two of the three pseudohermaphrodites. No excess was found in the urine of three women with an adrenogenital syndrome, a woman over fifty years of age who presented the Achard Thiers syndrome, or a pseudohermaphrodite aged four years.

A marked excess was found in the urine of one woman with an adrenogenital syndrome (adrenal hyperplasia), a woman with Cushing's syndrome (adrenal carcinoma), and one pseudohermaphrodite (adrenal hyperplasia).

JOHN J. MALONEY, M D

Twombly, G H Studies of the Nature of Antigonadotropic Substances *Endocrinology*, 1936, 20 311

Repeated injections of the gonadotropic hormone of human pregnancy urine into rabbits results in the formation in their sera of protective substances which, when the sera are injected into infantile female mice along with the hormone itself, prevents luteinization of the ovaries of the mice even when five times the minimal luteinizing dose of the hormone is administered. Such sera show very strong precipitin reactions to the hormone and these seem to parallel the protective properties of the sera.

Twombly concludes that these protective substances are antibodies formed by the injection of a foreign protein. He bases his conclusion on the following observations:

- 1 Hormones partially inactivated by heat or completely inactivated by aging seems to be as efficient in bringing about the formation of the protective substances as active preparations of the hormone.

- 2 The sera of three patients injected with large quantities of the hormone for two weeks, six weeks, and more than a year respectively gave no protection to the luteinizing effect of the hormone in infantile mice.

- 3 Long continued large doses of a non protein hormone, estrin, injected into rabbits failed to cause the formation of protective substances.

ELIZABETH CRANSTON

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NOTE—THE BOLD FACE FIGURES IN BRACKETS AT THE RIGHT OF A REFERENCE INDICATE THE PAGE OF THE ISSUE ON WHICH AN ABSTRACT OF THE ARTICLE REFERRED TO MAY BE FOUND

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INTERNATIONAL ABSTRACT OF SURGERY

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COLLECTIVE REVIEW

CONGENITAL MALFORMATIONS OF THE GASTRO-INTESTINAL TRACT A REVIEW OF THE LITERATURE FOR 1933-1935 INCLUSIVE

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THE older literature on congenital malformations of the intestinal tract consisted almost entirely of pathological reports. The more recent literature contains an ever increasing number of clinical discussions. A more universal familiarity with the clinical signs and symptoms characteristic of these anomalies, together with a less pessimistic attitude toward their surgical treatment is resulting in earlier diagnosis and operation with improved results. The problems involved are essentially mechanical and often amenable to solution by surgical treatment. In those cases in which the defects are multiple, little can be accomplished by any treatment.

The literature during the past three years has been comprehensive, covering all types of developmental defects which are encountered from the esophagus to the rectum and anus. There are included many reports of isolated cases as well as discussions based on rather large series of cases. In reviewing the subject it seems best to group the cases according to the location of the anomalies rather than according to the type of lesion.

ESOPHAGUS

Congenital atresia of the esophagus with or without tracheo-esophageal fistula continues to be an outstanding problem and one which is not infrequently encountered. Strong and Cummings agree with Rosenthal's theory that the anomaly is best explained as a result of primary deficiency in developmental capacities of the tissues concerned, and believe that local mechanical explana-

tions do not adequately answer the question. They state that the frequency of associated abnormalities bears out this theory. The most frequently associated abnormality, according to these authors, is atresia of the anus, which occurred in 24 of the series of 59 cases reported by Plass.

All the reported cases were fatal. Only 1 patient was subjected to operation, which consisted of gastrostomy. As stated by Stedje and Knight, "the mortality being 100 per cent following surgical intervention in this condition, no attempt was made to correct the condition anatomically." Iglauer proposed a stage operation which he attempted unsuccessfully in his case. The operation as planned by him consists of a first-stage cervical esophagostomy, a second stage lower segment esophagostomy with posterior implantation, and a third stage anastomosis of the 2 esophageal openings.

An interesting case of esophageal stenosis in which the obstruction was partial at the level of the seventh rib was reported by Gregory and Calthrop. The constricted portion was about $\frac{1}{4}$ in in length. Above the stenosis, the esophagus was dilated, while below, it was of normal caliber, "but at times there is seen (by fluoroscopy) a bulging and branching to the left, well above the level of the diaphragm." The infant was treated conservatively by liquid diet, and at the time of the report was making "slow but certain progress." The nature of the constriction was not stated. Esophagoscopy was not performed.

The congenitally short esophagus with a portion of the stomach above the diaphragm, a diagnosis made by x ray examination, is a condition which is relatively common in the opinion of Clerf and Manges. Of their group of 9 patients, 4 were children under nine years of age and 5 were women ranging from forty eight to sixty four years of age. In the children, the outstanding symptoms noted were dysphagia, regurgitation of food, and disturbances of nutrition and growth, most of which had been present since birth. In the adults, dysphagia and regurgitation of food were accompanied by distress after eating. The distress consisted of flatulence and pain, either epigastric or substernal, occasionally referred to the back, and attributable to ulceration above the hiatal level. Undernourishment was not a prominent feature. Esophagoscopy showed esophageal dilatation with varying degrees of esophagitis and ulceration. In contrast to the atresias, this condition responds well to treatment consisting of dilatations, alkali therapy, local applications to the ulcerations, and a dietary regime.

STOMACH

With the exclusion of hypertrophic pyloric stenosis, the stomach is less frequently the site of developmental accidents than are other parts of the intestinal tract. When such accidents occur in the stomach they seem to take the form of diverticula. Opinions differ as to whether gastric diverticula are congenital or acquired lesions. The consensus of opinion in recent years favors the latter hypothesis. Paul says "it is possible that various causative factors enter in different individuals, but the most logical theory at the present time seems to be that which presupposes a point of weakness in the gastric wall as the first essential."

Rivers, Stevens, and Kirklin state that while the cause of true diverticula of the stomach is not definitely known the hypothesis that they are congenital is plausible. They emphasize the rarity of diverticula of the stomach, stating that only 141 cases including 33 of their own (19 of which were not proved by operation) had been mentioned or reported in detail in the literature. On the other hand, the condition may occur more frequently than these figures indicate as in 74 per cent of the cases it is asymptomatic. Associated peptic disease occurred in 30 per cent of their cases. Bonnet reported a case with ulcer symptoms.

In the absence of a definite clinical picture, the diagnosis can be made only roentgenologically, and even so with difficulty unless the examina-

tion is done with great care. Paul discussed the x ray technique and differential diagnosis in detail.

Because of the lack of symptoms and the infrequency of complications, one would be inclined to feel that no treatment is indicated in this condition. However, Rivers, Stevens, and Kirklin advise surgical exploration in cases showing "roentgenologic evidence of such a condition and the presence of indigestion." Cunha advises medical treatment because of the mechanical difficulties of operation.

The literature on congenital hypertrophic pyloric stenosis continues to be voluminous, and the etiology of the condition remains obscure. Theoretical discussions of the role of spasm in the production of the muscular hypertrophy continue, those favoring the view that spasm is a factor feeling that the condition is acquired rather than congenital. McGill published a general discussion of the etiology, including the evidence in favor of the theory that the hypertrophy is due to a deficiency of Vitamin B.

In addition to published general discussions of the subject, several unusual cases were reported during the past three years. Roche reported the occurrence of hypertrophic pyloric stenosis in 2 boys representing the fifth and sixth pregnancies. The first, third, and fourth pregnancies had resulted in miscarriages, and the second in the birth of a normal healthy boy. Tribble reported 2 cases in a family with 3 children, the patients being the first and last born. Redgate encountered the condition in uni-ovular twins. Judd and Thompson published a discussion of hypertrophic stenosis of the pylorus occurring in adults. Observations on 30 cases formed the basis of the report, which intimated that the lesion was thought to be congenital. The pathological findings at operation were identical with those encountered in infants. Gastro enterostomy, resection of the anterior two thirds of the pyloric muscle with closure, and pyloric resection relieved the symptoms in all but 2 cases.

There exists a considerable difference of opinion as to when the symptoms in infants are due to pylorospasm and when to stenosis due to muscular hypertrophy. Some observers claim that all cases are cases of pylorospasm and can be successfully treated medically. Litchfield is of this opinion. It is due to this disputed point that the terms "pylorospasm" and "congenital hypertrophic pyloric stenosis" are used interchangeably in the literature. The consensus of opinion is that they are two distinct entities although they may co-exist in the same patient, and that no one has

yet proved that the former is not an etiological factor in the development of the latter

As an aid in definitely distinguishing between these conditions diagnostic laboratory procedures have been employed. By gastric analyses in a group of cases, Lasserre demonstrated the almost constant presence of hyperacidity with free hydrochloric acid

Meuwissen and Slooff developed a reliable x-ray technique for visualizing and measuring the length of the pyloric canal. The length of the pyloric canal as seen on the x-ray negative multiplied by a factor which allows for the film distortion closely approximated the actual length of the pyloric canal. In some cases the reliability of the measurements were substantiated at operation. The maximum error was 2 mm. By this method it was found that the pyloric canal in infants varies in length from 15 to 24 mm. Meuwissen and Slooff concluded that such a difference in length makes it probable that hypertrophic pyloric stenosis in infants is an anomaly. "When the length of the pyloric canal exceeds 6 or 7 mm the conditions are present that may cause the clinical picture of congenital pyloric stenosis." Along the same line, Friemann-Dahl has made extensive x-ray studies, developing a special x-ray technique to demonstrate anatomical changes in the canal.

The Rammstedt operation remains the best surgical treatment for the condition. Lamson described a method of caring for perforation of the mucosa occurring accidentally in the course of the operation. It consists of closure of the mucosa with a pursestring suture with reinforcement of the area of closure by a flap of contiguous pyloric muscle. Because of the danger of perforating the mucous membrane, Wolfson recommends making a vertical incision 0.5 cm proximal to the pyloric vein and then a longitudinal incision at right angles to the first.

Haberer, Norris, Eckstein, and Thompson, among others, have reported series of cases, presenting the results with detailed discussions. The mortality reported during the past three years has varied from 3.4 to 14 per cent. The differences in these figures can be explained in many instances on the basis of the duration of the disease and the general condition of the patient.

SMALL INTESTINE

Congenital obstructions of the small intestine are quite common and may be divided into 2 groups, intrinsic (atresias) and extrinsic, (stenoses, peritoneal bands, intestinal malrotation, etc.) Ladd, who has probably had more experience

with these conditions than anyone else, has published reports based on large series of cases of both types and has discussed the symptoms and physical signs in detail. The value of diagnostic laboratory procedures, particularly x-ray examination, was emphasized. Farber, reporting from the same clinic, advocated careful examination of meconium for cornified epithelial cells which are derived from the skin of the fetus and are swallowed by the fetus with other amniotic sac contents. He stated that the presence of such cells has been found to be an extremely valuable aid in the differential diagnosis.

Pre-operative preparation of the patients to combat dehydration and ketosis was emphasized by Ladd as a primary requisite for successful surgical treatment. He advocated the simplest technical procedure possible which is consistent with relief of the obstruction. In cases of atresia, and occasionally in those of stenosis, he has found this to be entero-anastomosis. He emphasized the importance of dilating the distal bowel, which usually is extremely small and almost rudimentary, to facilitate the technique of anastomosis. He warned against the tendency to consider the case hopeless because of the smallness of the distal bowel, pointing out that it soon dilates and functions normally after anastomosis. He has conserved time in the operative procedure by using a single Connell suture in making the anastomosis, and has found this adequate. He stated that in cases of intestinal malrotation it is necessary to free the colon from all attachments on the right, reflect it to the left, and thus expose the duodenum and the root of the mesentery.

He further pointed out that practically complete eversion is necessary to determine the type and extent of the involvement accurately, and that often nothing short of returning the bowel to the abdominal cavity in its original fetal position and relationship will relieve the condition. He emphasized that, because of the complexity of these congenital abnormalities, no one should undertake to relieve them surgically unless he is thoroughly familiar with all the possible defects to be encountered and the various methods of dealing with them.

Sager and Solnitzky discussed anomalies of the intestine in general and reported a case of atresia due to a diaphragm obstructing the lumen of the bowel. For the relief of such an obstruction they advocated perforation of the diaphragm by means of a probe inserted in the bowel above it. They feel that this partially relieves the obstruction and that the passage of intestinal contents dilates the contracted distal bowel, thus facilitating the

technique of anastomosis necessary later for complete relief of the obstruction¹

Numerous case reports of various types of intestinal atresias have appeared. T. F. Corhill and H. K. Corkill discussed the subject in general and atresia of the ileum in particular. A case of duodenal stenosis due to an unusual constricting band was reported by Magendie and Pouyanne. Rocher, Roudil, and Courriades cited a more unusual case in which the duodenal stenosis was caused by an abnormal hepatic pedicle, the hepatic artery from the superior mesenteric artery ran posterior to the duodenum, and the portal vein crossed the duodenum anteriorly at about the same point. An interesting case was reported by Madigan. The patient, thirty years old, could never remember having had a spontaneous bowel movement. Apparently all his life he had evacuated the gastro-intestinal tract by vomiting. X-ray examination revealed a hugely dilated stomach and duodenum, the second portion of the latter occupying the entire pelvis. Apparently a partial, although almost complete, obstruction existed in the third portion of the duodenum. Operation is not mentioned in the report.

Diverticula and Cysts

One might well question the inclusion of duodenal diverticula in a discussion of congenital anomalies; a consensus of opinion seems to be that the majority of duodenal diverticula are acquired. However, most observers agree that the theory of a congenital origin or predisposition cannot be totally disregarded.

Duodenal diverticula were extensively discussed by Piergrossi, emphasis being placed on the roentgenological diagnosis. One gains the impression that he feels that too much emphasis is placed on the differentiation between true diverticula, which involve all coats of the bowel, and false diverticula, which involve only the mucosa and serosa since in the process of development the latter may result from the former through stretching distention, etc. He feels that no one theory of origin of duodenal diverticula is applicable to all cases. In favor of a congenital origin are the following facts:

In most cases there exists no pathological lesion which could result in diverticula formation. Associated congenital anomalies are frequent. The diverticula have been observed in the newborn. The occurrence of pancreatic rests in the

walls of a diverticulum is common and denotes a disturbance of embryonic development.

The theory of acquired origin assumes pulsion or traction as the causative agent. The theory that pulsion is responsible assumes weakening of the bowel wall due to the presence of aberrant pancreatic tissue in some instances and abnormal penetration of the bowel wall by blood vessels in others. Weakening due to healed ulcers is likewise accused. An increase in pressure in the bowel lumen, while not considered necessary in the genesis of duodenal diverticula, is a very important factor. According to Piergrossi, traction diverticula are rare.

Also according to this observer, the symptomatic pictures presented by patients with duodenal diverticula are so bizarre that a positive diagnosis can be made only by x-ray examination. However, pathological changes are often initiated by mechanical difficulties such as torsion, strangulation, or angulation resulting in stagnation of the intestinal contents with subsequent infection and occasionally perforation. Other vague and mild gastro-intestinal symptoms may be produced by the effect of the diverticulum on neighboring organs.

From the x-ray standpoint, Piergrossi feels that a diverticulum should have 3 fundamental characteristics, namely, insensibility to pressure, mobility on palpation, and persistence of its shadow after the main stream of barium has passed on. He emphasizes, however, that such characteristics may lose their significance in particular cases and must be interpreted with common sense.

The prognosis and treatment depend on the severity of the symptoms. The medical treatment is purely symptomatic. The surgical treatment is difficult, it often being difficult even to find the lesion at operation. Piergrossi varies the surgical procedure according to the location and accessibility of the diverticulum.

Cases of various anomalies of the duodenum were reported by Kellogg and Collins and by Bonar. Breton discussed the so-called mobile duodenum. He feels that in this condition the roentgenological findings fall into 1 of the following 3 groups: (1) images showing anomalies of rotation, (2) images showing elongation of the first portion of the duodenum, and (3) images of invagination of the first 2 portions. It is questionable whether any but the first is congenital in origin.

The enterogenous cyst reported by Gardner and Hart occurred in the duodenum and was undoubtedly congenital. As removal was impos-

¹ NEVERMAN'S NOTE. In such cases longitudinal division of the bowel over the point of obstruction with removal of the diaphragm (which we now perform with the endotherm knife) and transverse suture of the bowel as first advocated by Morton in 1913 (*Am J Dis Child* 1923 25:391) would seem a more logical procedure.

sible because of its size and location, an anastomosis between the cyst and adjacent duodenum was performed. The results were excellent.

There is scarcely enough evidence supporting the congenital origin of so-called multiple intramesenteric diverticula of the jejunum-ileum to justify inclusion in this review of the excellent reports on the subject by Fraser and Butler. However, this condition is so closely allied to congenital diverticula and so ably discussed by both authors that attention should be directed to their reports. The condition is characterized by the occurrence of a number of diverticula (as many as 400 have been found in a single case) in the jejunum and upper ileum. The diverticula are thin-walled sacs arising from the mesenteric border of the gut, and vary from small conical pockets the size of a pea to large globular diverticula 7 cm or more in diameter. The weight of evidence favors the theory of acquired origin, which both Fraser and Butler accept. Both authors cite their own experimental work to support their contentions. Madinavetia and Schmidt and Guttman have also recorded cases.

Meckel's diverticulum and associated complications have been the subject of much discussion. Severe melena as a sign of the existence of such a diverticulum has been emphasized. The hemorrhage originates from associated polyps or inclusions of gastric mucosa which ulcerates because of constant contact with intestinal contents (Starling, Cbesterman). Unusual cases of giant diverticula or duplication of a diverticulum were reported by Hudson, Mackenzie, Carlson, and Mueller. Hertzog and Carlson and I Price reported cases of carcinoid tumors occurring in Meckel's diverticula.

Cysts and diverticula (other than Meckel's diverticula) of congenital origin occurring in the ileum were reported and discussed by Poncher and Milles and Hughes-Jones. In the case reported by Poncher and Milles, extrapleural cysts of enterogenous origin were present in the thorax in addition to the diverticula in the ileum. Both reports agreed in the opinion that, because of their widely scattered distribution, these cysts and diverticula are not of vitelline duct origin. The fact that, despite their location in the ileum and thorax, they frequently contain gastric mucosa and pancreatic tissue substantiates the theory of congenital origin. This in turn lends evidence in favor of the theory of epithelial sequestration in the embryo. Reference is made to the work of Lewis and Thyng with regard to diverticula or accessory epithelial nodules derived from intestine which not infrequently occur along

the esophagus, stomach, and small intestine in embryos and ordinarily disappear.

While these formations are mainly of embryological and pathological interest, a knowledge of their characteristics is of interest and importance also to the clinician. As they have no distinctive symptoms, the diagnosis is rarely made. Floderus encountered such a formation or one similar to it in operating for appendicitis. Surgical removal, if possible, is the only satisfactory treatment.

LARGE BOWEL

Congenital anomalies of the large bowel and rectum are quite common and frequently associated with other abnormalities. Kleinfelter reported a case of complete absence of the colon, and Louyot, Richon, and Lacourt and Green and Ross reported cases of congenital absence of the appendix. Asai described a case of duplication of the entire large bowel. Pratt and Rasmussen each encountered a case of "double appendix." In both cases there were many other associated abnormalities. The excellent discussion of Edwards on diverticula of the vermiform appendix is worthy of attention. However, unless one assumes a congenital weakness predisposing to diverticula formation, diverticula should not be included in a discussion of congenital abnormalities.

Kantor discussed the roentgenological diagnosis and the clinical significance of anomalies of the colon consisting of abnormalities of rotation, descent, and fixation, and presented a complete statistical study based on 2,000 observations in which he correlated the predominating symptoms and the x-ray findings.

Martinotti discussed in great detail the symptoms and roentgenological characteristics of dolichocolon. This condition, an increase in the length of the colon, is most often confused with megacolon. Total dolichocolon is rare, the lengthening usually being segmental and the remainder of the colon normal or shorter than normal to compensate for the increased length of the affected loop. In a certain number of cases there is an associated "megacolon," which Martinotti feels is a secondary dilatation resulting from "stenosis of position" (kinking). A large part of his report is devoted to the various types and distinctive roentgenological findings in each type. In discussing the etiological theories he stated that he favors the mixed theory. According to the latter, an anatomical anomaly forms the basis on which a pathological process acts to lead eventually to an accentuation or increase of the congenital malformation. Dolichocolon is essen-

tially congenital Martinotti's discussion is most complete and contains excellent illustrations of the various x ray findings

Seneque and Milhiet reported on their experiences in the surgical treatment of dolichocolon. They consider persistent and obstinate constipation, abdominal pain, and acute obstruction (volvulus) the indications for surgical intervention. They advocate local resection of the colon and an immediate end-to-end anastomosis exteriorized in the wound. They close the peritoneum carefully around the intestinal loops with the anastomosis resting at the bottom of the wound. After the anastomosis has healed they return it to the abdominal cavity. The advantages claimed for this method are that it includes the time saving features of an immediate end-to-end anastomosis without the usually associated dangers, and eliminates the long process of stage operations. In 5 cases in which this method was used the results were successful although there was an "occasional fistula." Seneque and Milhiet conclude that the absence of complications and the excellent results it yields warrant its being used by others.

Truesdale reported "the rarest of all developmental abnormalities of the colon," retroposition of the transverse colon. Only 11 cases have been reported in the literature. The abnormality is due to an error of the second stage of rotation of the mid gut when the embryo is about 40 mm long. In Truesdale's case the transverse colon was behind the duodenum and superior mesenteric artery and the cecum and ascending colon were large and distended. The anomaly was discovered during the course of a laparotomy for another condition. To illustrate the various types of the abnormality, Truesdale cited 6 cases from the literature.

Multiple adenomatosis of the colon while not a congenital anomaly, is closely allied to such anomalies in that it is an inheritable disease transmitted by, and affecting both sexes. Lockhart Mummery stated that, as it is not present at birth but develops usually at puberty, the hereditary factor is the susceptibility of the epithelial cells of the large intestine to proliferate at a certain age. The other outstanding feature of the disease is "a very marked tendency for one or more of the adenomata to form the starting point of a malignant adenocarcinoma." Nearly all patients with the condition develop carcinoma sooner or later—most of them at an early age. Because of the occurrence of malignant de-

generation in practically 100 per cent of the cases, complete colectomy, even though appearing extremely radical for patients so young, is the only logical treatment. Lockhart Mummery cited the case of a young girl in which he did a complete colectomy fifteen years previously. At the time of the report the patient was in good health although all her brothers, sisters, aunts, and uncles were dead and those who did not die in infancy had died of carcinoma.

The various congenital malformations of the rectum and anus reported by various observers (Amelune, Cabanes, Fitzpatrick and Hillman, Starlinger and Richter, Veal and McFetridge MacFec, Cook, Prabther) were thoroughly covered by the detailed discussion of Ladd and Gross which was based on 162 cases. As this report probably represents the most extensive experience of any observer, it is extremely valuable. The authors' classification of the anomalies is preceded by a detailed discussion of the embryology which is of importance in the selection of the operative procedure and determination of the prognosis. The 4 groups in the classification have the following characteristics:

1 Incomplete rupture of the anal membrane or stenosis at a point from 1 to 4 cm above the anus. In the majority of 21 cases repeated rectal dilatations proved to be adequate treatment.

2 Imperforate anus or obstruction due only to a persistent membrane. Cruciate incision of the membrane followed by dilatations is the treatment indicated.

3 Imperforate anus with a rectal pouch separated from the anal membrane, the most frequently encountered abnormality. In 86 per cent of the 117 cases reviewed it was possible to overcome the deformity by a perineal type of operation in which the rectal pouch was brought down to the anal sphincter. The total mortality in this group was 24.3 per cent. Of the patients still living, 77 have a normally functioning anus, 4 have a permanent colostomy, and 7 are awaiting further operative procedures.

4 Anus and anal pouch normal, but rectal pouch ending blindly. This anomaly is the most difficult to treat because the rectal pouch is frequently so high in the pelvis that it cannot be reached by a perineal approach. The total mortality in the 13 cases reviewed was 61.6 per cent. The 6 patients still living have a normally functioning anus.

The symptoms and physical signs are essentially those of complete or partial intestinal obstruction. Careful examination of the anus and rectum gives sufficient information for the diag-

REVIEWER'S NOTE: My experience with such cases has been that end-to-end anastomosis is impossible because of the proximal bowel dilatation and resulting disproportion in the size of the lumina of the proximal and distal bowel.

nosis and classification of the anomaly X-ray examination of the infant in the inverted position is a valuable aid in determining the distal extent of the rectal pouch and whether or not it can be reached by a perineal operation

The presence of associated congenital anomalies and defects, of which fistulas (rectoperineal, rectofossa navicularis, rectovaginal, recto urethral and rectovesical) were most frequent, was an important factor in the selection of the operative procedure and in the ultimate outcome in a given case Ladd and Gross discuss in detail the selection and technique of the operative procedures and their indications

In the entire group of 162 cases there were 43 deaths As 12 of the deaths were directly attributable to associated congenital abnormalities, the mortality attributable to the anorectal abnormalities and their complications treated by experts, was approximately 19 per cent As might be expected, the mortality in Group 1 was the lowest, 9.5 per cent, and that in Group 4 the highest, 61.6 per cent

Ladd discussed in detail the technical procedures for the cure of these anomalies MacFee described the operation by which he transplanted a congenital vulvovestibular anus Price reported the operative procedures which he employed with success for both rectal and bladder incontinence Interlocking fascial loops enclosing the anal orifice, as described by Werden and by Stone, resulted in good rectal control Price employed the same principle for bladder control The urethra near its orifice was encircled by a fascial loop which was anchored to the recti muscles Flexion of the spine, by relaxing the fascial loop, allowed the bladder to empty The result obtained was excellent, the patient being able to retain urine to the amount of from 350 to 400 ccm without leakage As might be expected, careful postural training was necessary following the operation in order to overcome leakage of urine

GALL BLADDER

Congenital absence of the gall bladder was discussed in detail by Stefaneli in connection with the report of a case Deaver reported a case associated with absence of the extrahepatic ducts Ugelh and Tailhefer discussed congenital dilatation of the common duct and associated bile cysts Of 115 cases which Tailhefer collected from the literature, recovery resulted in only 49 Anastomosis of the dilated duct or of the bile cyst with the duodenum had the lowest mortality, 30 per cent

Complete or partial intestinal obstruction due to malrotation of the intestine and abnormal fixation of various intestinal segments is common, between 15 and 20 case reports and discussions having appeared during the past three years These abnormalities are associated frequently with intestinal atresias and stenoses and occasionally with internal and umbilical hernias In all instances the diagnosis of obstruction warrants surgical exploration even though in many cases the condition is hopelessly complicated and not amenable to surgical correction

In most discussions of congenital intestinal atresias and stenoses fetal peritonitis is included among the causes Metcalfe reported the case of an infant operated upon eight hours after birth, at which time a generalized peritonitis was found A pint of deep yellow flocculent fluid was removed "The entire abdominal contents were firmly cemented together by a strong fibrinous deep yellow exudate that covered all organs and suggested scrambled eggs" Cultures of the abdominal cavity proved to be sterile Death occurred seven hours after operation A careful search at the postmortem examination failed to reveal any intestinal perforation although the maturity of the exudate in the region of the cecum and ascending colon prompted a most painstaking search in that area Microscopic examination of various portions of the intestinal tract showed no inflammatory process in the intestine or mesentery, and lymphocytes and leucocytes were conspicuous by their absence No obvious cause of the peritonitis was found

On the other hand, Medearis reported 1 case and DeVel 2 cases in which generalized peritonitis occurring in newborn infants was due to spontaneous intestinal perforation All 3 of the infants appeared normal at birth When feeding was started, abdominal symptoms appeared and the infants soon succumbed In 2 cases the diagnosis was made at operation and postmortem examination In the third, roentgenograms showed pneumoperitoneum

Previous to these reports, there were records of 29 cases which apparently could be divided into 2 large groups In those of the first group there was usually an associated obstruction leading to intestinal distention It is assumed that pressure on a constricted or twisted distended loop of intestine during delivery was responsible for the perforation In the cases of the other group, in which there was no organic obstruction, the condition was attributed to meconium stasis, "intestinal aplasia with faulty or deficient innervation," primary vascular insufficiency, or

diverticula In 1 of the cases reported by DeVel, microscopic examination of the intestine at the site of perforation showing thinning of the muscular coats as the area of perforation was approached and also some thrombosis of vessels. The most frequent sites of such perforations are the ascending and transverse colon and the terminal ileum.

In conclusion it should be emphasized that a surprisingly large number of these congenital intestinal abnormalities can be corrected surgically. The high mortality attending operation on newborn infants should not be regarded as a contra indication to surgery. On the other hand, improvement in the results is dependent upon increased accuracy in diagnosis, particularly localization, and a thorough knowledge and understanding on the part of the surgeon of the various anomalies to be encountered. Careful and adequate pre operative preparation is of primary importance, as are also gentleness of technique and minimal manipulation at operation. No infant should be denied the chance which surgery offers since from such treatment there is every thing to gain and nothing to lose.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Ersner, M. A., and Myers, D. Outstanding Signs and Symptoms in Sinus Thrombosis. *Pennsylvania M. J.*, 1936, 39: 579.

Thrombosis of the lateral sinus as a complication of middle ear and mastoid suppuration never fails to exert a mental effect. The usual textbook picture is rarely observed. Even after the diagnosis is made, the physician is still in a quandary as to the best plan of treatment.

Members of the profession have apparently divided themselves into three groups: those who always ligate the internal jugular vein, those who never ligate the jugular vein, and those who treat each case individually. The third group attempts by the use of their best surgical and medical judgment, to decide which cases should be treated by ligation and which should be treated expectantly.

The symptoms and signs of lateral sinus thrombosis may be divided into two groups—the local and the general.

The general symptoms and signs include fever, chills, convulsions, changes in the pulse, mental disturbances, changes in the blood and spinal fluid, and other changes revealed by laboratory studies, and evidences of metastases to various parts of the body.

The local signs and symptoms are centered about the external surface of the mastoid and the mastoid cavity, and vary with the type of mastoid and the condition of the lateral sinus and the internal jugular vein. Knowledge of the condition of these structures is obtained by inspection, palpation, ophthalmological observations, and various diagnostic tests.

GENERAL SIGNS AND SYMPTOMS

Fever. Elevation of the temperature is the most common sign, occurring in 87.5 per cent of the cases. It is of the step-ladder type with frequent remissions. At the onset of phlebitis or sinus thrombosis the temperature may remain at a sustained level for several days. When a thrombus is formed the fever is intermittent. In phlebitis, the fever is remittent but never intermittent. Chills concurrent with a rise in the temperature in the presence of an ear infection should lead to the suspicion of lateral sinus involvement.

Chills. The next most prominent sign in sinus thrombosis is chills, which occur in about 47.5 per cent of the cases. There may be a high temperature with an abrupt remission and chills, an elevation of the temperature without chills, or no fever or chills,

but profuse sweats. The chill is an inconstant factor, but of the utmost importance.

Convulsions. Convulsions are rather infrequent. They occur as the result of toxemia especially in children.

Pulse changes. The pulse rate invariably parallels the temperature.

Mental disturbances. The patient is usually mentally alert during remissions of the fever, but at the height of the fever and during a chill is apt to be drowsy and apathetic.

Blood cultures. Blood cultures are of value only when they are positive. They are positive in from 20 to 50 per cent of cases. A positive blood culture is an indication of infection and, when considered with the other signs, is an aid in the diagnosis. Positive blood cultures may be found in practically every acute infection. A negative culture does not rule out the presence of infection in the lateral sinus. The organism most often isolated in such infection is the streptococcus hemolyticus.

Changes in the blood. A progressive reduction in the hemoglobin and the red cells in the presence of sepsis indicates a hemolytic infection and a depression of the hematopoietic system.

Changes in the spinal fluid. The Tobey-Ayer test gives positive results in a varying percentage of cases, but the incidence of error is high.

Metastasis. Metastasis is due to bacteremia and does not depend solely on disorganization of the thrombus. Metastasis occurring in the muscles and about the joints is usually a favorable sign as it often acts as a fixation abscess, clearing the blood stream of organisms. Metastasis occurring in a viscous is usually an unfavorable sign.

LOCAL SIGNS AND SYMPTOMS

Neck rigidity. should be judged by careful palpation. It may be due to injury of the sternocleidomastoid muscle at the time of operation or, especially if there has been a preceding sinusitis, tonsillitis or pharyngitis, to cervical adenitis.

The anterior border of the sternocleidomastoid muscle should be palpated for evidence of tenderness along the course of the internal jugular vein. Deep tenderness may be due to involvement of the internal jugular vein.

At the time of operation, the presence or absence of a thrombus may be determined by palpation. When a thrombus is present the sinus has a doughy feel, often pits on pressure and may pulsate. A purulent abscess without a fibrinous exudate or granulation tissue covering is most dangerous.

Discoloration of the surface of the lateral sinus is not an index of the contents of the lumen

Ligation of the jugular vein is not entirely satisfactory in solving the therapeutic problem

In sinus thrombosis it is necessary to overcome infection septicemia thrombosis, embolism, and metastasis. In combating these conditions both medical and surgical measures are used. The medical treatment consists of the administration of tonics, repeated blood transfusions, chemotherapy and the administration of autogenous and stock vaccines and of specific and non-specific sera.

The surgical treatment consists of evacuation of the thrombus from the lateral sinus if such a thrombus is present, and obliteration of the sinus by packing.

The third surgical principle is ligation of the internal jugular vein to obliterate the channel carrying the infection. Frequently however the collateral circulation is overlooked.

Of the cases reviewed by the authors, metastasis occurred after ligation in 33 per cent.

If, in the authors' cases, an occluding thrombus that can be easily removed is found and free bleeding is obtained from both ends the lateral sinus is merely blocked by packing and nothing is done to the internal jugular vein. If a phlebitis of the lateral sinus is found in the absence of thrombosis the sinus is incised and obliterated and no treatment is given the jugular vein. If a thrombus is found and bleeding from the lower end cannot be obtained in the presence of severe septicemic symptoms with local physical signs in the neck indicating extension of the thrombotic process downward the internal jugular vein is always ligated.

CHARLES J. H. BATES, M.D.

Merle D. Aubigné, R. Chronic Intraparotid Adenopathies (A propos des adénopathies chroniques intra parotidiennes). *J. de chir.*, 1936 47 792.

Chronic intraparotid adenopathies may be confused with tumors of the parotid gland. The author reports three cases of tuberculous adenitis and one case of malignant lymphogranuloma in which operation was performed for a supposed mixed tumor of the parotid.

There are three groups of lymphatic glands connected with the parotid: a superficial pre-auricular group, two extraglandular subaponeurotic groups and a deep intraglandular group. The deep lymphatic glands from four to ten in number, are usually situated in the cellular tissue which separates the superficial and deep lobes of the parotid. Sometimes however, they lie in the parenchyma of the superficial or deep lobes of the gland. They drain the skin of the frontal and temporal regions, a part of the face and the eyelids and receive the lymphatics of a good part of the ear, not only the external ear but also the tympanic membrane and the eustachian tube. These facts explain why tuberculosis of these glands is not so common as tuber-

culosis of the cervical glands, which drain the mouth and pharynx.

The differentiation of intraparotid adenopathy from parotid tumor is important as the treatment indicated for the two conditions is different. A careful study should be made of the regional and distant gland groups, the entire body examined for signs of tuberculosis, the family history studied and a cell count made. Hodgkin's disease is characterized by polynucleosis and eosinophilia. If the differentiation cannot be made in any other way, biopsy should be done. If biopsy is unsuccessful surgical removal is indicated. As it is claimed that surgical removal hastens the inevitable end in Hodgkin's disease, the surgical specimen should be very carefully examined histologically.

AUDREY GOSS MORGAN, M.D.

EYE

Troncoso, M. U. and Castroviejo, R. Micro Anatomy of the Eye with the Slit Lamp Microscope. Part I. *Am. J. Ophth.*, 1936 19 371-481.

In this very detailed and exquisitely illustrated article, consisting of two parts (a third part will appear later), the authors report the findings of the use of the slit lamp microscope for anatomical investigation of the anterior segment of the eye, especially in the mammalia.

After examining the angle in living animals with the gonioscope they enucleated the eyes for the slit lamp study. They point out the advantages of observing the structures from in front under high magnification instead of by the ordinary method of reconstruction by serial sections which must be examined, sometimes by the hundreds, to obtain a clear idea of the structure of the region. Under examination with the slit lamp the frontal aspect appears strikingly beautiful in mammalia. By following the tissues to the edge of the bisected eye, a much better understanding of the arrangement of the structures and of their mutual relations may be obtained. The authors have used dry preparations, placing the specimens in a special stand devised by them which can be adjusted for observations in any plane and is attached to the stem of the chin rest of the ordinary slit lamp. They have used also wet preparations, placing the specimens under water in special jars of perfectly optical thin glass.

The same technique was used for pathological specimens with strikingly good results.

The authors emphasize that, in addition to examination by the two methods, dry and wet, a careful dissection of the specimens under the microscope, with tearing and separation of the various structures layer by layer, and a study of their mutual relations is of importance. With some care they have been able to probe Schlemm's canal with the fine wire of a hypodermic needle, and by dissection to observe the structure of the trabeculum in a flat preparation.

LESLIE L. MCCOY, M.D.

Alueyer, H. C., and O'Brien, G. S. Panophthalmitis Due to Clostridium Welchii. *Arch Ophthalm.* 1936, 15 1003

The authors review cases of clostridium welchii infection of the eye which have been recorded in the literature and report in detail a case of their own.

Their patient was a farmer who was struck in the right eye by a fragment of steel while he was working with a punch and hammer on a farm tractor. Within a few hours after the injury fulminating panophthalmitis with gas in the anterior chamber developed. A clinical diagnosis of infection with gas bacilli was made. Evacuation of the eye and the administration of polyvalent gas gangrene antitoxin were followed by recovery. Clostridium welchii was isolated in pure culture from the anterior chamber.

LESLIE L. MCCOY M.D.

Kirwan, E. O'G. The Etiology of Chronic Primary Glaucoma. *Brit J Ophthalm.* 1936 20 321

Epidemic dropsy is the only known general disease of which glaucoma forms an integral part. Hence it is the most important lead we have with regard to the pathogenesis of glaucoma.

In epidemic dropsy, whether considered from the general, ophthalmological, or dermatological aspect there is never any evidence of inflammation. The two outstanding manifestations are vasodilatation of the whole capillary system and increased permeability of the capillary endothelium.

In the eye, microscopic examination of the filtration angle shows that the canal of Schlemm and the tissues in the immediate vicinity present no abnormalities as regards either cellularity or fibrosis. There is an enormous dilatation of the capillaries of the choroid, but no evidence of an inflammatory process in the uveal tract.

Glaucoma associated with epidemic dropsy is characterized by very high tension occurring in both eyes at the same time, failure of motility to reduce the tension, a normal or deep anterior chamber, and absence of inflammation and external signs of congestion. It may occur at any age and may be the first manifestation of the toxemia.

In the treatment, anterior sclerotomy is of very little value. In all of the author's cases in which this was done, sclerocorneal trephining was necessary later.

The primary factors in the production of an increase in the aqueous humor in the eyeball are (1) a decrease in the colloid osmotic pressure of the serum, (2) an increase in the permeability of the capillary walls such that the albumin molecules can pass through from the capillaries into the aqueous humor, and (3) an increase in the hydrostatic pressure in the blood capillaries.

LESLIE L. MCCOY M.D.

Samuelson, A. Primary Tuberculosis of the Conjunctiva. *Arch Ophthalm.* 1936, 15 975

Primary tuberculosis of the conjunctiva is a very rare condition, being found in only 1 of 30,000 cases

of ocular disease. As a rule the process is localized to the palpebral conjunctiva and is characterized by ulcers, granulations, or proliferations of the conjunctiva. Usually the tubercle bacillus cannot be found. As there is always swelling of a preauricular gland the condition has frequently been diagnosed as Parinaud's conjunctivitis. However, the latter should be regarded as a syndrome of which tuberculosis of the conjunctiva is only one cause. To determine the condition responsible for it microscopic examination of the tissue and the lymph node as well as cultures may be necessary.

Samuelson reports three cases of primary tuberculosis of the conjunctiva all of which were quite typical. In one, the bacilli were of the human tubercle bacillus type. The patients were ten, fourteen, and twenty-eight years of age. In none of the cases was it possible to determine the source of the infection and in none had an injury been sustained prior to the onset of the disease. In all, Finlen treatment proved sufficient to cure the conjunctival lesion with good cosmetic results.

Formerly the prognosis of primary tuberculosis of the conjunctiva was believed to be very grave but today has apparently been improved by the use of Finlen therapy.

WILLIAM A. MANN, JR. M.D.

EAR

McNally, W. J., Stuart, E. A., Reid, T. F., and McConnell, L. H. An Experimental Investigation of Tinnitus. *J Laryngol & Otol.* 1936, 51 363

This article reports a study of nineteen cases of tinnitus taken at random without regard to the character, duration, or intensity of the symptom, the type of associated deafness, or the patient's age. In the majority of the cases the chief complaint was the tinnitus rather than deafness.

Practically all of the experiments carried out were directed toward altering the cerebral circulation by the administration of drugs acting on the sympathetic or parasympathetic systems, such as ephedrin hydrochloride, ergotamin, mecholyl, and bellasoline, injection of the sphenopalatine ganglion, the intravenous injection of glucose, or the application of a constricting band about the neck. In three of four cases in which the stellate ganglion was removed surgically, the tinnitus decreased.

In summarizing their results the authors state that in most cases the tinnitus remained unaffected by alteration of the cerebral circulation.

JOHN F. DEERIN, M.D.

MOUTH

Hofer, G. Resection of the Base of the Tongue (Ueber Resektion des Zungengrundes). *Ztschr f Hals usw Heilk.* 1935, 53 194

Many tumors, even when they extend to or into the epiglottis, can be removed radically by resection of the base of the tongue. The best operative ap-

proach for this procedure is through the hypothyroid space. As the typical subhyoid pharyngotomy in its classical form does not yield sufficient exposure the author recommends the modification of Hajek and Hofer, namely, temporary section of the hyoid bone or, if paramedian section is not desired, lifting of the entire hyoid bone upward which becomes easily possible after division of the infrahyoid and sublingual muscles. The modified subhyoid pharyngotomy for resection of the base of the tongue therefore consists of bilateral paramedian division of the hyoid bone or total separation of the muscle fibers inserted into the tongue from the hyoid bone, followed by displacement of the latter upward.

The difficulties and the dangers for the patient begin after the operation. These are difficulty in swallowing and the danger of postoperative aspiration of wound secretions. The disturbance of the swallowing mechanism is due to the absence of the protecting tongue base and the epiglottis and to immobilization of the musculature which raises the larynx in the act of swallowing. The difficulty in swallowing after total extirpation of the tongue is practically irremediable and nearly always renders it necessary to perform a secondary laryngectomy to close off the airway from the pharynx. After partial resections there is a possibility that the normal ability to swallow may be restored to a certain degree by suitable exercises.

The resection should not extend beyond the region of the foramen cæcum. During the operation most careful protection of the airway is essential. This requires preliminary tracheotomy and careful walling off of the larynx with a tampon. The tampon should be left in the airway for several days after the operation until the postoperative secondary infection of the wound has been cleared up by the elimination of necrotic particles. It is advisable to perform the preliminary tracheotomy and ligation of the lingual artery as a first stage operation. Most careful removal of lymph nodes is essential.

ROBERT H. IVY, M.D.

NECK

Peterson E. W. and Meeker L. H. Tumors of the Carotid Body. *Ann Surg.* 1936, 103: 554.

From the records of members of the New York Surgical Society and of the New York Postgraduate Hospital the authors collected eighteen cases of tumor of the carotid body, the largest series to be reported to date. Eleven of the subjects were

females. The ages of the patients ranged from twenty-five to fifty-six years and averaged thirty-eight years. The length of time the tumor had been present varied from four months to thirty years. In the operative cases there were no surgical deaths, but five deaths from malignancy occurred, four, eight, nine, forty-eight, and forty-eight months respectively after the operation. Malignancy occurred in from 45 to 50 per cent of the cases. Of seven patients who were subjected to carotid ligation, three developed cerebral lesions due to impairment of the circulation.

The authors discuss briefly the anatomy, embryology, and pathology of the tumors, the origin of the carotid bodies from the neural tube and the differentiation of these bodies into chromaffin-cell and sympathetic ganglion cell masses. They state that because of the inconstancy of its presence its atrophy at puberty, and the questionable results of experimental work regarding it, the carotid body is probably quite unimportant and probably does not have an internal secretion.

Tumors of the carotid body are usually single, smooth, deeply situated, slowly growing, painless, firm, and elastic neoplasms. They are movable laterally but not vertically and show transmitted but not expansive pulsations. They occur at the bifurcation of the common carotid. The only symptoms and signs of the presence of such a neoplasm are a palpable mass and symptoms such as may be ascribed to pressure on the vagus or the pharynx.

The authors advise surgical removal of the tumor although it has a mortality of more than 30 per cent. They cite a case reported by Bevan in 1929 in which cure was obtained by roentgen irradiation but state that such treatment is usually unsatisfactory.

They recommend the following approach to the problem of treatment:

1. Early diagnosis.
2. Digital compression of the common carotid several times a day to promote collateral cerebral circulation or the application of a compression band to the artery to slow its blood flow.
3. Exploratory operation with biopsy to determine whether the tumor is benign or malignant.
4. If the tumor is malignant and if no signs of impairment of the circulation have followed the preliminary treatment, complete removal of the neoplasm. If the preliminary tests show that the carotid vessel cannot be ligated without producing hemiplegia, treatment by irradiation.

G. DANIEL DELPRAT, M.D.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS, CRANIAL NERVES

Rand, C. W. Alterations in the Visual Fields Following Craniocerebral Injuries *Arch Surg*, 1936, 32 945

In craniocerebral injuries the entire cerebral pathway from the retina to the occipital lobe may be involved. Retinal and preretinal hemorrhages, edema about the macula, commotio retinae, and detachment of the retina follow direct injury to the eyeball or occur secondarily to head trauma. The visual disturbances secondary to commotio retinae or hemorrhage tend to clear up, whereas those consequent to detachment of the retina are permanent unless they are corrected surgically. Rarely, unexplainable transient choked disk occurs. Most frequently, choking of the disk accompanies chronic subdural hematoma, abscess of the brain, or pneumocephalus. Loss of vision following hemorrhage into the orbit is slowly progressive. Hemorrhage under the sheath of the optic nerve, frequently associated with fracture of the orbit, impairs or destroys vision. Rupture of the central artery or vein or acute angulation at their point of emergence from the nerve causes blindness. The optic nerves may be severed by a bullet. Orbital fractures, especially those involving the optic canal, cause monocular blindness and, in rare instances, binocular blindness.

Chiasmatic lesions are thought to be caused by contrecoup, especially from a blow on top of the head. The chiasma usually splits anteroposteriorly. Lesions of the optic tracts cause homonymous hemianopsia. Lesions of the occipital lobes cause homonymous quadrantanopsia, altitudinal hemianopsia, and visual aphasia. Following concussion, transient blindness is not infrequent. Alterations of the visual fields due to hysteria are more common than those due to organic causes. Three types of changes are characteristic: concentric contraction of the field with or without central amblyopia, tubular fields, and reversal of color fields.

The author gives a brief resume of the literature on alterations of the visual fields following craniocerebral injuries and reports twenty-four cases showing such changes. DAVID J. IMPASTATO, M.D.

Deery, E. M. Remarks on the Effects of Roentgen Therapy upon the Gliomas *Bull. Neurol. Inst. New York*, 1936, 4 572

Although exact knowledge of all of the effects of roentgen irradiation upon gliomas is lacking, the clinical indications for this treatment are now fairly standardized and it has come to be used in practically all cases. Surgery, even if done only for decompression, should always precede the irradiation.

From the therapeutic standpoint, cases of glioma are divided into three groups: (1) those in which direct surgical attack on the tumor is impossible, (2) those in which complete removal is impossible, and (3) those in which the situation or character of the growth preclude anything except the removal of a small biopsy specimen of the tumor. Since only a minority of gliomas can be removed completely, irradiation, if it is beneficial, is of the utmost importance.

From many points of view information is still needed with regard to the effect of irradiation on various types of glioma. The author discusses some of the literature to show what has been learned and the methods by which the problem has been approached. It is apparent that conclusions as to the beneficial effect of roentgen or radium therapy are still vague and based chiefly on apparent clinical improvement. Articles dealing specifically with the histopathological effects of irradiation on gliomas have been few.

Deery reports a study of cases of glioma treated at the Neurological Institute of New York which he made in an attempt to correlate the clinical observations with the histopathological changes seemingly due to irradiation. Many of the cases observed were excluded from the study because the requirements for acceptance were the removal of a generous operative specimen, followed by adequate irradiation, followed by the removal of a generous second operative specimen or autopsy. Only fifty cases met these requirements, but these included all of the currently recognized types of glioma. From the clinical standpoint, the survival period—the time from the onset of the first neurological sign or symptom to death—was considered the only exact criterion by which the results of the irradiation could be judged.

Correlation of the clinical, operative, radiotherapeutic, and histopathological aspects was found to be impossible. To explain the failure the author cites in detail a number of cases which showed numerous discrepancies. Although he is convinced that irradiation influences the course of many gliomas favorably, he is equally certain that at the present time this cannot be shown statistically with any fairness to irradiation therapy. He states that he is unable to present a detailed analysis of the various groups of gliomas studied because the statistics, carefully compiled as they were, lack comparability.

As examples of changes which he believes were brought about by irradiation, he reports four cases from the histopathological viewpoint with photomicrographs. He admits and emphasizes that these cases were selected, but states that the fields shown

were representative fields of the tumors before and after irradiation. Comparison of the pre irradiation and post irradiation specimens has convinced him that irradiation sometimes causes marked retrograde changes in the tumors as judged from their microscopic appearance.

In summarizing he says:

Some of the gliomas of each type showed striking histopathological changes which it seemed reasonable to credit to the irradiation. Others showed less convincing changes and still others none.

The histopathological changes considered due to the irradiation seemed primarily effects upon the tumor cells. Frequently there were manifestations of cell injury which when severe resulted in death of the cell. There was an increase of necrosis and often an appreciable reduction of the cellularity of the growth as determined by cell counts. Also as determined by counts mitotic figures in general were less frequent following the irradiation. Post irradiation specimens sometimes showed the appearance of or an increase in giant cell forms.

The impression was gained that the blood vessel and connective tissue phenomena commonly seen after irradiation are secondary and essentially incidental changes.

Histopathological changes caused by the roentgen therapy were found not only in tumors of a low order of differentiation such as medulloblastomas but also in tumors of a high degree of maturity, such as astrocytomas.

Attempts to determine the relative sensitiveness of the various gliomas to irradiation therapy should be based on larger numbers of cases than are seen at any one clinic. From comparable cases collected from many clinics much valuable information should be gained. The histopathology, survival period and total quantity of irradiation given should be correlated.

From the study herewith reported and recent studies of collected cases it appears that exact information regarding the reaction of gliomas to irradiation will require the acceptance and adoption of very clearly defined standardizations of certain factors which directly affect the statistics of the problem. Chief among such factors are the description of the location and size of the tumor and of the operative procedure carried out on the neoplasm. Standardization of the pathologist's conclusion regarding the malignancy of the given tumor and agreement as to what constitutes adequate irradiation dosage and comparable roentgen therapy technique.

WOLFF HARTUNG, M.D.

Capella, F. A Voluminous Neurofibroma of the Hypoglossal Nerve in a Case of Familial Recklinghausen's Disease. (*Voluminoso neurofibroma del nervo ipoglossale in un caso di malattia di Recklinghausen familiare*). *Riv di chir.*, 1936, 2: 169.

Capella reports the occurrence of von Recklinghausen's disease in a mother and three daughters. The father and two sons were unaffected. The

mother showed only cutaneous tumors, one daughter pigmentation only, and another daughter pigmentation subcutaneous tumors and small tumors of the nerves. The third daughter, aged twenty six years had subcutaneous tumors, scattered small tumors of the nerves, and a large neurofibroma of the hypoglossal nerve. The latter growth, first noticed seven years previously, had increased rapidly within the last year causing dysphagia, dyspnea in the supine position, pain radiating to the mastoid and jaw and a change in the voice. At the time of operation the tumor occupied the parotid and upper two thirds of the sternocleidomastoid regions. It had burrowed deeply inward at the carotid bifurcation and upward between the internal carotid artery and the deep jugular vein and had wedged itself between the mastoid and styloid processes. It was encapsulated and firmly adherent to the deep fascia. The hypoglossal nerve spread out and disappeared in its upper pole. The growth was completely removed but the nerve was necessarily sacrificed. The tumor measured 7 by 5 cm. and weighed 85 gm. Histologically it was a typical neurofibroma. Three months after the operation the patient still showed deviation of the tongue and experienced some difficulty in chewing and swallowing.

In the discussion the author calls attention to the difficulty of differential diagnosis between a carotid gland tumor and a solitary neurofibroma in the carotid area. The literature contains a number of cases of nerve tumors in this location which required operation, but they appear to have been solitary neurinomas. Capella has found only two reports of operations for neurofibromas of the cervical region in von Recklinghausen's disease—one by Stuttgart and the other by Leclerc and Pont both published in 1932. In the case reported by Stuttgart the tumor was presumably connected with the vagus. In that reported by Leclerc and Pont it developed from the carotid region toward the maxillary pharyngeal space and produced the Claude Bernard Horner syndrome. Neurofibromas of the hypoglossus are extremely rare. Capella knows of only two which were treated surgically—one reported by Worster Drought and Hill in 1929 and the other by Eisenberg in 1936. As neither was associated with von Recklinghausen's disease, Capella concludes that the case he reports was the first in which operation was performed for a proved neurofibroma of the hypoglossus in that condition.

The article is accompanied by photomicrographs and an extensive bibliography.

M. I. MORSE, M.D.

SPINAL CORD AND ITS COVERINGS

Watkins, K. H. The Bladder Function in Spinal Injury. *Brit J Surg*, 1936, 23: 734.

After reviewing the innervation of the bladder and the mechanism of urination the author reports a study of bladder pressures and the mechanism of

urination in seven cases of spinal injury. He found that in cases of lesions of the conus and cauda equina the detrusor muscle had lost its function of powerful contraction, but the patient was able to empty the bladder by utilizing the abdominal muscles. In cases of complete transverse cord lesions the behavior of the detrusor muscle was very different. In the presence of active lower spinal segments, detrusor contraction similar to normal continued to take place. Although the sphincter muscles are paralyzed in regions of the conus and cauda equina, considerable resistance is required to empty the bladder. The author believes this depends upon the pressure and elasticity of the tissues surrounding the urethra in the region of the triangular ligament.

The findings of his study emphasized the fundamental importance to bladder function of active sacral spinal segments. The influence of these segments below a complete transverse lesion promotes a perfect reflex micturition which differs essentially from the normal in being entirely independent of bladder control. However, in cases of lesions of the conus and cauda equina there is less discomfort from the loss of bladder function than in cases of transverse cord lesions. In the former, the resistance of the tissues about the bladder neck prevents the escape of fluid and the patient can be trained to empty the bladder by contraction of the abdominal muscles, whereas in the latter there is an entirely reflex micturition which he is unable to control.

ROBERT ZOLLINGER, M.D.

SYMPATHETIC NERVES

Stookey, B. *Neurosurgical Measures for the Relief of Pain*. *Surg. Clin. North Am.* 1936, 16: 637.

Neurosurgical measures for the relief of pain should be used as soon as it has been determined that the pain cannot be relieved by attacking the primary disease and if it is known, from the nature of the affection, that the pain will probably persist or increase.

Relief of pain may be attempted by injection of alcohol into the nerve trunks (intraneural injection), about the nerve trunks (perineural or paravertebral

block), or into the subarachnoid space. Alcohol injected into the peripheral nerves causes degeneration of the sensory fibers, the degree of which depends on the amount of alcohol injected. The effect is greater on the sensory than on the motor fibers. Therefore the injection of 85 per cent alcohol into a nerve trunk may interrupt transmission of the sensory impulse without interrupting the motor impulse. Intraneural injection is more effective than perineural injection. The duration of the relief of the pain is dependent in part upon whether the injection was made into or around the nerve. It generally ranges from six months to a year. Less frequently, it may be as long as two years. As the injection does not destroy the cell bodies, regeneration with ultimate return of the symptoms takes place. The injections may be repeated a number of times, but in many instances the scar tissue that eventually forms in and about the nerve makes the injection of alcohol no longer possible so that dorsal root section or some other surgical procedure must be performed. For this reason neurosurgeons prefer primary operation.

Relief of pain may be obtained surgically by sectioning the peripheral nerves, the dorsal roots, the spinothalamic tract (chordotomy), or section of the crossing pain and temperature fibers as they pass in the anterior commissure to reach the opposite side of the cord (myelotomy). As regeneration usually occurs following section of the peripheral nerves, section of the dorsal roots is preferable. When it is properly performed, dorsal root section brings about total and permanent anesthesia to all forms of sensation. Chordotomy, which is employed for the relief of pain from diseases of the extremities or of the abdominal and thoracic viscera, causes loss of pain and temperature sensation only. If the incision into the spinal cord is made accurately, motor paralysis does not follow. Myelotomy is performed for bilateral painful affections of the upper extremities.

The author gives the indications and carefully describes the procedures and operations of this interesting and important field of neurosurgery.

DAVID J. IUSTAZZO, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Heiman, J., and Krebiel O F The Influence of Hormones on Breast Hyperplasia and Tumor Growths in White Rats *Am J Cancer* 1936 27 450

The variations occurring in transplanted benign fibro adenomas of the rats breast cannot be attributed solely to variations in the implant. Endogenous endocrine factors in the host probably play a part in their causation. In pregnant rats the transplants grow rapidly and often develop into pure adenomas. During pregnancy the breast is under continuous stimulation by estrogenic hormones which may affect the transplanted tumor.

The increase in the rate of growth and number of takes of these tumors in male castrates bears some relation to endocrine imbalance. The decrease in the rate of growth and number of takes in female castrates may also bear some relation to such an imbalance.

In experiments reviewed by the authors Antuitrin S and theelin in combination increased the incidence of tumor growth in both male and female castrates. Antuitrin G, Antuitrin S or theelin injected singly or in combination caused no morphological changes in the transplanted tumor. Antuitrin S or Antuitrin G and theelin in combination produced a definite increase in breast hyperplasia leading to the formation of benign fibro adenomas.

After growing in young sexually immature rats, the transplanted fibro adenoma becomes a cellular fibroma or sarcoma. After passing through several generations the cellular fibroma or sarcoma retains the same morphological characteristics even when it is implanted into adult or old animals.

CHARLES BAKOV M D

Nicolson W P and Berman M D Carcinoma of the Breast *Ann Surg* 1936 103 683

This is a report on more than 250 cases of carcinoma of the breast admitted to the Steiner Cancer Clinic over a period of years with special reference to the incidence of five year cure. In a number of the cases the cancer was a recurrence which had developed after a previous operation or the condition was too far advanced for any except palliative measures. Seventy four of the cases were operable according to the standard of Lee viz cases with or without invasion of the axillary lymph nodes in which the tumor was not fixed to the chest wall. However this standard was used mainly for the statistical study as many patients declared inoperable were operated upon radically for palliation.

In over 75 per cent of the cases the first sign of the cancer was a lump in the breast. Pain in the

breast was the first symptom in 8 per cent. Other initial symptoms occurred in fewer than 3 per cent each. Of the 170 patients in whom the first sign was a lump in the breast 47 were regarded as operable and 15 remained free from symptoms at the end of five years after operation. Of 19 patients whose initial symptom was pain, 6 were subjected to operation and 2 of the latter remained free from symptoms at the end of five years. Of the 40 other patients 18 were treated by operation and 7 of the latter remained free from symptoms after five years. Some of the presenting symptoms such as painful swelling of the arm, diffuse involvement of the breast, pain in the lower part of the back, and a lump in the supraclavicular region seemed to indicate a more unfavorable prognosis. In addition to operation a definite routine pre-operative and postoperative x ray therapy was carried out.

A study of the incidence of carcinoma of the breast at various ages indicated that the condition frequently develops in persons much younger than the generally recognized cancer age. In such persons the incidence of five year cure is relatively high. In the cases of patients between the ages of forty six and fifty years there is an unexplained drop in the incidence of five year cure.

The 1 male among the patients whose cases are reviewed by the authors was inoperable.

In unmarried women the incidence of cancer of the breast is lower than in married women but the incidence of five year cure is lower than in married women or widows. The findings of a study of the effect of the number of lactations on the incidence of cancer of the breast seemed to indicate that while in women who have borne children the incidence of breast cancer is over 3 times the incidence in nulliparous women, operability and the incidence of five year cure are also higher in the former, especially in women who have had 2 or more lactations.

The degree of malignancy of the tumors was determined by 2 methods, one based on the clinical findings and the other on the histological findings. Neither was infallible but in general the clinical grading was of more aid in determining the prognosis than the histological grading. It was suggested that the pathologist as one member of the cancer team should have sufficient clinical data to enable him to grade tumors more accurately.

The great majority of the lesions in the reviewed cases occurred in the upper portion of the breast. This fact is attributed to the erect position with consequent traction disturbance of the circulation and imperfect lymphatic drainage of the upper half. Tight brassieres also interfere with the circulation. The use of a supporting garment which does not cause constriction should considerably reduce the

incidence of breast lesions. In cases of pendulous heavy breasts plastic operations may be indicated.

JAN I. TREMINE, MD

Portmann U. V. A Comparison of the Results in a Series of Cases of Carcinoma of the Breast Treated by Postoperative Roentgen Therapy for Prophylaxis, with a Similar Series in Which Operation Was the Only Treatment. *Int. J. Cancer*, 1936, 27: 1.

The medical literature of the last twenty years has been replete with reports dealing with the curability of carcinoma of the breast by radical operation. According to 44 statistical reviews studied by the author, the incidence of five year survival ranged from 15 to 50 per cent and averaged 28 per cent. The variations in the results of different surgeons must be attributable to differences in the carcinomas treated, the low incidences of survival occurring in the cases in which operation was performed in the more advanced stages of the disease and the high incidences in those in which operation was performed only in the earlier stages.

Other reports deal with series of cases operated upon by several surgeons and with comparisons between series of cases treated by operation alone and by operation combined with irradiation. These reports vary so greatly that many investigators have drawn the unjustified conclusion that irradiation does not increase the period of survival and may indeed lessen it. In such comparisons account is seldom taken of the fact that it is usually the patient with advanced cancer, whose condition is more or less hopeless who receives irradiation as palliative treatment while the more easily curable patient suffering from early cancer without metastases is treated by operation alone. In the drawing of conclusions regarding the results of any type of treatment of cancer of the breast and in the comparison of different methods of treatment it is necessary to take into account (1) the time at which the treatment was given, (2) the technique used, (3) the aim of the treatment, whether cure or palliation, and (4) the type of the growth treated.

Irradiation treatment given previous to 1920 must be regarded as empirical and experimental. Methods have progressed and techniques have been improved greatly in the last six years. As irradiation may be given for palliation, for cure or for prophylaxis conclusions must be drawn with these differences clearly in mind. The grouping of malignant tumors by pathologists has been based on histological characteristics. It is observed, however, that carcinoma of the breast may show morphological differences in widely separated parts of the tumor, in the glands, or in other structures. Therefore, in order to arrive at a conclusion as to the degree of malignancy of a given carcinoma it is necessary to take into consideration the effect of the tumor upon the breast as a whole and its relationship to neighboring and distant structures. A tumor regarded as inherently highly malignant on the basis of microscopic ex-

amination may be localized and may therefore have a more favorable prognosis from the standpoint of curability than a growth with a low degree of malignancy which has extended beyond the breast. Accordingly, the classification of carcinomas of the breast on the basis of the histological findings is of much less importance clinically than a classification based on the extent of the disease.

The author reports on 405 cases of carcinoma of the breast operated upon by Crile in the period from 1895 to 1931. In 170, the treatment consisted of operation alone, and in 235, of operation supplemented by roentgen therapy. The cases are divided by Portmann into 3 groups according to a plan similar to that of Strenthal. Group 1 consisted of cases without clinical or microscopic evidence of metastases in the axillary lymph nodes, Group 2, of cases in which involvement of axillary lymph nodes was definitely proved by pathological examination, and Group 3, of cases in which a large part of the breast was involved, or the tumor had invaded the skin and underlying structures, or the supraclavicular nodes were enlarged.

These groups are divided into 2 series—one treated by operation alone, all by one surgeon (Crile), and the other treated by operation and postoperative irradiation by one radiologist (Portmann) with the use of a single technique. This technique, which was employed from 1922 to 1933 but has now been discarded, is described in an addendum. In all of the cases the clinical diagnosis was confirmed by microscopic examination. Cases of sweat gland cancer, Paget's disease of the nipple, papillary carcinoma, and sarcoma were excluded.

The author compares the results in the 2 series in separate group and combined groups by tabulating the number of patients who could not be traced or who died with or without cancer in successive yearly periods up to five or more years after the operation. Each series is first tabulated by numbers according to the described grouping, and from these numbers tabulations are made according to percentages calculated on the basis of the total number in each group or series, including the cases of patients who could not be traced or who died of conditions other than cancer. There are 18 tables.

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In the cases of Group 2, those with a moderate degree of axillary involvement and without a very extensive carcinoma, irradiation was beneficial and prolonged life by at least a year. These cases also constituted about 25 per cent of the total number.

In the cases of Group 3, those of advanced carcinoma, postoperative prophylactic roentgen therapy was beneficial and prolonged life by about a year. These constituted about 50 per cent of the total number.

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In the cases of Group 3, those of advanced carcinoma, postoperative prophylactic roentgen therapy was beneficial and prolonged life by about a year. These constituted about 50 per cent of the total number.

In the irradiated series of cases the percentage of patients dead with cancer at the end of five years was 47 whereas in the non irradiated cases it was 53. The corresponding percentages of survivals were 30.6 and 37.6. The differences indicate that irradiation was of some, though slight, benefit.

Indications of incurability of cancer of the breast are listed by the author as follows:

Skin edema (pig skin or orange peel skin)
brwny red induration and inflammation
multiple nodules ulceration

Breast edema diffuse infiltration
multiple tumors in the breast
fixation to the chest wall

Metastases numerous or fixed axillary nodes
supraclavicular nodes
edema of the arm
metastases in the lungs bones or other organs

Previous operation incomplete resection

All of the patients who had any of these indications of incurability fell into Group 3. A large percentage of this group died soon after operation. Of those who were incurable one third died within six months and one half within a year after treatment by operation alone. It is therefore concluded that operation alone did not prolong their lives.

It appears that any operation upon a patient with one or more indications of incurable carcinoma of the breast will be of no benefit and, in fact, may be harmful. It is suggested that the improved methods of irradiation employed during the past few years will be of greater benefit to hopelessly incurable patients that surgeons should make every effort to recognize the indications of incurability, and that when indications of incurability are present the treatment should consist of irradiation alone.

J. DANIEL WILLEMS, M.D.

TRACHEA, LUNGS, AND PLEURA

Morell J. B. and Morell A. C. Familial Developmental Defects of the Respiratory System (Dysgénésie familiale du système respiratoire). *Arch. méd.-chir. de l'appar. respir.* 1936, 11, 63.

The authors report the occurrence of congenital lesions of the respiratory tract in six members of a family, the father, his three children and two uncles. Two of the patients presented all of the defects of the series:

1. Pulmonary arteritis with dilatation of the arterial trunk.

2. Multiple cysts or cystic disease of the lungs and abnormalities of the bronchi.

3. A vascular hematic syndrome, the first element of which was constant whereas the second was variable, consisting of erythremia and cyanosis or endothelial hemorrhages.

4. Deformity of the lower ribs, the thorax appearing "en cloche" or trapezoidal according to the projection.

In the father only one defect—the thoracic deformity—was present. One patient had pulmonary arteritis, erythremia, cyanosis and a thoracic deformity which was slightly evident only

in the roentgenogram. Another had pulmonary arteritis, pulmonary cysts, erythremia, cyanosis and a thoracic deformity. A fourth had pulmonary arteritis, erythremia, cyanosis and possibly a few small pulmonary cysts.

It is probable that the paternal grandfather who died at the age of seventy years was suffering from the same condition as he had a cyanotic coloration—his lips were almost black—and asthma complicated by constant progressive dyspnea.

The occurrence of the thoracic deformity and the pulmonary cysts which are recognized as congenital defects and the very early and practically congenital cyanosis in these patients suggest that the pulmonary arteritis was also a developmental defect. The familial occurrence of the defects and their various groupings in different members of the family suggest some coordinating factor although the tissues involved—ribs, lungs, pulmonary artery, vascular endothelium and blood—are differentiated anatomically and embryologically. On the other hand these tissues are related physiologically in all of the phases of the respiratory process—thoracic pulmonary, hematic, vascular and capillary. Functionally, the thorax, lungs, pulmonary artery, blood and vascular endothelium may be considered as one large system, the respiratory system fulfilling the following functions: thoracic movement, gaseous exchange in the lungs, renewal of the blood, pulmonary circulation, gaseous exchange through the capillaries, and general circulation. On this basis, the syndrome described may be considered not a fortuitous association of various developmental defects but an embryological abnormality affecting the development of the respiratory system with its many complex functions.

The clinical findings in the six members of the family are reported in detail and the roentgenograms are reproduced.

ALICE M. MEYERS

Backer Grondahl N. Plombage of Tuberculous Disease of the Lungs. Technique and Results (Plombierung tuberkuloöser Lungenerkrankungen. Technik und Ergebnisse). *Acta chirurg. Scand.* 1936, 78, 1.

Plombage is an operative procedure which, in suitable cases, yields excellent results relatively rapidly. It is conservative and painless, and followed by few complications.

The best results are obtained in unilateral and not too extensive apical involvement of the fibrous type with small cavities or systems of cavities the walls of which are not very thick.

Good results are obtained also in a large percentage of cases of bilateral involvement. Frequently in such cases the disease process on the other side becomes cured without local treatment.

In cases of old cavities the results are less satisfactory although as a rule it is possible to collapse the cavities.

Still less satisfactory are the results in cases of large single cavities with rigid walls. For such

cavities a primary apical plastic procedure is preferable

The amount of material used may be as great as 500 c cm

Of great aid to the surgeon in the carrying out of the procedure are roentgenograms taken during the operation

Haight, C. Complementary Anterior Thoracoplasty for Pulmonary Tuberculosis *J Thoracic Surg.* 1936, 5 453

In certain cases of pulmonary tuberculosis, complementary anterior thoracoplasty is an important adjunct to posterolateral thoracoplasty. It provides the additional collapse necessary to effect and maintain the closure of cavities that cannot be closed by posterolateral thoracoplasty alone.

An important reduction of the operative mortality and morbidity has resulted from performance of the thoracoplasty in a horizontal plane as well as in the usual vertical plane.

A technique for parasternal division of the costal cartilages with resection of the remaining anterior costal stumps is presented. The cartilages, with the exception of the first which is resected, are hinged at the sternum so that they may swing posteriorly and mesially, thereby increasing the pulmonary collapse. As the cartilages are not resected, stability of the thoracic wall is obtained eventually whereas the former technique with resection of the cartilages resulted in a permanently soft anterior thoracic wall due to failure of the residual perichondrium to develop firm cartilage. Preservation of the cartilages also decreases the anterior deformity.

J. FRANK DOUGHTY, M.D.

O'Shaughnessy, L. The Vagus and Its Relation to the Surgery of the Lung *J Thoracic Surg.* 1936, 5 386

Sudden death following operations on the lung have been thought to be due either to air embolism or stimulation of the vagi. In experiments on dogs the author found that traction on the root of the lung produced an alteration in the respiratory and cardiovascular activities. When electrical stimulation of the anterior and posterior surfaces of the lung root was substituted for mechanical stimulation, stimulation of the posterior lung root caused an alteration in breathing. At times, an orthopnea was produced, and at other times a difference in the rate and the character of the respiration. Stimulation of the anterior surface of the lung root caused an increase in the pulse rate, irregularity in cardiac action, and a fall in the blood pressure. These effects were most marked when the electrode was applied to the subpleural tissue. Resection of the vagus in the neck just above the lung root abolished the respiratory reflex, but did not affect the cardiac reflex. When the stellate ganglion of the upper dorsal sympathetic chain was anesthetized both reflexes remained unaffected. The local application of cocaine rendered both areas insensitive, but was

dangerous because of absorption of the drug. The injection of a 1 per cent solution of novocain beneath the pleura covering the lung root abolished both respiratory and cardiovascular effects. The administration of atropine had no effect on these reflexes.

The author concludes that the vagus is an important sensory nerve and should be blocked with novocain when operations are performed on the lungs. He states that a swab soaked in 1 c cm of cocaine is innocuous and will at least protect against cardiovascular disturbances.

ALTON OCHSNER, M.D.

Mason, G. A. Extirpation of the Lung *Lancet*, 1936, 230 1047

Six patients suffering with extensive unilateral bronchiectasis were treated by pneumonectomy. All were between the ages of seven and eighteen years. The disease was in the right lung in one and in the left lung in five.

Two stage methods were used in all of the cases. In the first three patients the entire lung hilum was secured by mass ligation at the first stage and the sloughing lung was removed from ten days to two weeks later with the cautery. One of the three died at the time of the second operation and it was found that most gangrene of the lung had taken place. The last three patients were treated by complete removal of the lower lobe at the first stage and complete removal of the upper lobe at the second stage two, three, and twelve months later respectively. One patient of this second group died fourteen hours after the second operation. Autopsy revealed that the vagus nerve had been injured when a mass hilar ligation was placed.

At the time of the publication of the report the four surviving patients were quite well. All had a defect of the thoracic wall and persisting bronchial fistulas.

RICHARD H. OVERHOLT, M.D.

Carlson, H. A. Acute Empyema Thoracis *J Thoracic Surg.* 1936, 5 393

Adequate drainage has been regarded by most surgeons as of importance in the treatment of empyema, but varies in different cases. In some cases repeated aspiration is sufficient, whereas in others, particularly those due to pneumococcal infection, open thoracotomy is necessary for cure.

Sterilization of the empyema cavity by the use of various antiseptics has been advocated. It is probable, however, that the irrigating solution is of value chiefly to wash out the pus, fibrin, and necrotic tissue and maintain the patency of the drainage tube.

Because of the controversy as to whether expansion of the lung is brought about by an increase in the intrapleural negative pressure or by cohesion of the parietal and visceral layers of pleura, the author attempted to solve the problem by experiments on rabbits. Purulent pleural effusions were produced in the animals by injecting defibrinated blood, iodized oil, and aleuronat emulsion.

with staphylococci into the pleural cavity. Normal rabbits withstood an open pneumothorax very poorly; they soon became cyanotic and dyspneic and died. Rabbits with empyema and open pneumothorax also soon succumbed. However, when an animal with an open pneumothorax was placed in the negative chamber expansion of the lung and healing of the empyema resulted. It was found that the differential pressure required to expand the lung in empyema is definitely greater than the pressure required to expand a normal lung or an atelectatic lung with a normal pleura. Pleural exudate and fibrinous adhesions are important factors interfering with expansion of the lung. Microscopic examination of the experimental empyema showed that the visceral and parietal pleurae were first replaced by granulation tissue and subsequently by fibrous adhesions between the approximated pleural surfaces.

Carlson concludes that in clinical cases the healing of empyema is the result of obliteration by union of the opposed inflamed pleura. He states that blowing exercises were found to have little effect in clinical cases of empyema unless they were associated with negative pressure in the pleura. Adequate drainage and negative pressure applied to the pleural cavity by means of an airtight drainage system resulted in early expansion of the lung and obliteration of the empyema cavity. In early cases a traction may be of value. When the pleural exudate is thin intercostal catheter drainage is efficacious. However, rib resection is better as it establishes more adequate drainage, especially when negative pressure which favors re-expansion of the lung can be maintained.

ALTON OSMAN, M.D.

Opran J. Completely and Partially Encysted Pleuritis. Les pleurites enkystées et cloisonnées de la grande cavité. *Soc. méd.-chir. de l'Appar. respir.* 1916, 11, 10.

Opran states that partial pleurisy may localize in any part of the thoracic cavity and may become completely or partially encysted either by old adhesions at the time of a recurrent acute attack or by a marked defense reaction at the time of the primary acute attack. Before the use of roentgen examinations such encysted pleuritis was usually found only at autopsy. Fluoroscopy is most valuable in revealing the presence of an encysted pleurisy, but for clear demonstration of the extent and conformation of the condition it must be preceded by withdrawal of the pleural exudate followed by the insufflation of air.

Completely encysted pleuritis may be distinguished from partially encysted pleuritis. According to their location encysted pleuritis may be classified as pleuritis of the apex, axillary pleuritis and pleuritis of the base. Encysted pleuritis of the apex are rare. They are usually due to pneumococcus infection and secondary to pneumonia. The chief physical sign is an area of absolute dullness with resistance to the palpating finger over the entire region of the apex.

Axillary pleuritis are more frequent. They also are often due to pneumococcus infection. They generally follow a generalized pleurisy which becomes localized and encysted in the axillary region. Their symptoms are often slight. Percussion reveals an area of dullness below the axilla. Fluoroscopic examination after removal of the fluid and insufflation of air clearly demonstrates the location of the pocket and often the thickness of the pleural shell enclosing it.

Pleuritis of the base may be primary or secondary. Usually they are well limited to the base and the physical signs of dullness and respiratory silence are of limited extent.

The following physical signs are suggestive of the presence of an encysted pleurisy: absence of dullness in Traube's space in the presence of a considerable pleural effusion on the left side, a circumscribed zone of dullness with abolition of the vesicular murmur in the same area or in the case of partially encysted pleurisy a resonant band between two zones of dullness; the withdrawal of only a small amount of fluid on puncture when there are signs of extensive pleural effusion and the persistence of physical signs above the point of puncture or if the puncture is made in back their persistence in front. The diagnosis can be made definitely only by fluoroscopic examination following withdrawal of the fluid and the insufflation of air. Five illustrative cases of various types of encysted pleurisy are reported by the author with the findings of fluoroscopic examination.

Cases of encysted pleurisy are of two types. In those of the first type there has been a previous pleurisy or severe pulmonary disease which has left pleural sequelae. In the new attack of pleurisy the effusion therefore occurs in a pleura already divided into compartments by adhesions and becomes confined in one or more of these compartments and partially or completely encysted. In the second type there are no pleural adhesions but the formation of septa or the encystment proceeds rapidly during the acute attack because of the presence of considerable amounts of fibrinogen in the pleural exudate.

AUCIE M. MEYERS.

HEART AND PERICARDIUM

Barach A. L. Dickinson W. R. and Parsons W. B. Oxygen Treatment and Thyroid Ablation in the Treatment of Heart Disease. *Ann. Int. Med.* 1935, 9, 1513.

The authors have demonstrated the efficacy of placing patients with congestive cardiac failure in an oxygen chamber for a prolonged period. This adapts the atmospheric air to the patient's breathing requirement. Humgart and his associates approached the problem by performing thyroidectomy which adapts the patient's breathing capacity to his breathing requirement by reducing the latter and adapting it to the requirement of the reduced metabolism.

In twelve cases of cardiac conditions the authors employed both methods. The patients were placed in an oxygen chamber before the operation, and when they were removed to the operating room they were given oxygen intranasally at the rate of 5 liters per minute. The operations were performed under local anesthesia. Immediately after the operation the patients were replaced in the oxygen chamber for varying periods of time.

Eight of the twelve patients had congestive heart failure and four had cardiac pain without failure. There were no operative deaths, but three patients died within six months after the operation of progressive coronary thrombosis.

Of the eight patients with congestive cardiac failure, four, including one with hyperthyroidism, showed striking improvement after the treatment. Two were not benefited and died at the end of a month and six months respectively. Two showed moderate improvement.

Of the four patients who complained of cardiac pain, two were definitely relieved and two were not relieved.

The authors are of the opinion that oxygen therapy is of value before operation to bring the patient to a state of relative compensation, and that after operation it tends to reduce the incidence of anoxic shock and oxygen debt.

FRED S. MODERN, M.D.

ESOPHAGUS AND MEDIASTINUM

Kelly, A. B. Some Esophageal Affections in Young Children. *J. Laryngol. & Otol.*, 1936, 51, 78

The author states that esophageal affections in children are diagnosed more frequently in dispensaries than in private practice because the symptoms are not characteristic and, in private practice, x-ray examination, the first and most important step in the diagnosis, is often omitted. As a rule x-ray examination is delayed until serious consequences from starvation have arisen. If the diagnosis is made early, these consequences may be prevented by dilatation of the obstruction.

The conditions discussed by Kelly are (1) dilatation of the esophagus with atrophy of the walls and dilatation of the cardia, (2) congenital shortening of the esophagus with thoracic stomach, (3) progressive narrowing and shortening of the esophagus with hiatal hernia, (4) spasmodic constriction in the lower third of the esophagus with hiatal hernia, (5) congenital stenosis of the esophagus with recurring spasm and ascending narrowing, and (6) spasm of the lower end of the thoracic esophagus and of the cardiac canal.

In all of these conditions there is a uniform widening of the esophagus above the obstruction, and in all of the reviewed cases simple dilatation was followed by relief.

Regurgitation may begin in the very early days of life, but more often occurs first when a solid or semi-solid diet is given. When the obstruction is high, it

occurs promptly after the ingestion of even small amounts of food. When the obstruction is at a lower level, it is delayed until a much larger quantity of food has been taken and sometimes for a surprisingly long time. It occurs without effort and does not seem to disturb the child. Older children with esophageal obstruction are always undernourished and undersized for their age. In at least some of the cases reviewed the condition was evidently due to both antenatal and postnatal factors.

Endoscopic examination is of value to confirm the roentgen findings with regard to the location of the obstructing lesion and to permit inspection of the interior of the esophagus above and below the lesion.

The author reports the autopsy findings in a number of cases and presents photomicrographs showing atrophy of the muscular coats with consequent thinning of the walls of the esophagus.

Primary or functional spasm of the esophagus is said to include the great majority of spasms of early life and to occur usually in the lower part of the thoracic esophagus. While its cause is unknown, congenital predisposition and emotional disturbances are thought to be important factors. In all cases the x-ray examination should be followed by endoscopic examination to rule out foreign bodies,



Fig 1 Atrophy of the muscular coats of the esophageal wall

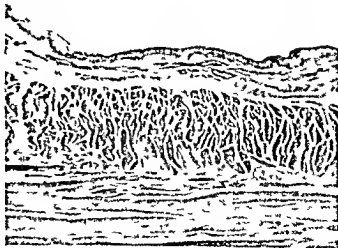


Fig 2 Normal muscular coats of the esophageal wall

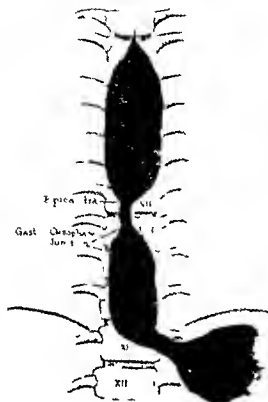


Fig. 3 Shortening of the esophagus with thoracic stomach

ulceration, constriction, congenital structure and compression due to a mediastinal growth. When a local cause cannot be discovered, constant disturbances such as allergy, endocrine disturbances, vitamin deficiency, and nervous hypersensitiveness should be considered.

In discussing shortening of the esophagus, the author presents a table showing comparative measurements of the normal and abnormal esophagus in young children. He states that shortening of the esophagus may be congenital or postnatal or may begin before birth and continue to develop after birth.

The discussion of shortening of the esophagus with traction of the stomach through the diaphragm into the thorax is supplemented by a drawing and a roentgenogram. Kelly states that this abnormality is not so rare as is generally supposed. As treatment all that is required is the passage of a bougie. In later childhood there is less trouble from spasm. Kelly knows of no case in which death could be directly attributed to manition caused by obstruction of the cardiac canal of a congenitally short esophagus. He states that autopsies on adults have proved that the presence of a thoracic stomach due



Fig. 4 Shortening of the esophagus with thoracic stomach

to congenital shortening of the esophagus does not preclude the attainment of healthy old age.

In several of the cases reported the shortening of the esophagus was due evidently to both antenatal and postnatal factors. The latter were mainly of the nature of an ascending fibrosis. In several cases this condition proved fatal.

MILLARD F. ARBUCKLE, M.D.

Camplani M. A Contribution to the Roentgenology of Esophagobronchial Fistulas (Contributo alla conoscenza radiologica delle fistole esofago-bronchiali). *Radiol. med.* 1936 23 178

The diagnosis of esophagobronchial fistula during life is not easy. The condition is usually discovered accidentally or at postmortem examination. For the detection of such lesions x-ray examination has proved of great value.

The clinical picture suggests a condition of a certain severity often accompanied by acute involvement of the respiratory tract and general septic

phenomena Death usually results The most common symptoms are (1) a violent cough following the ingestion of food, which may be convulsive and is accompanied by a peculiar grunting sound, (2) vomiting, (3) cyanosis, which is observed most often in newborn infants with congenital fistulas, (4) dysphonia or aphonia, (5) tracheo esophageal gurgling, and (6) the elimination of small particles of food during coughing

The author classifies these fistulas into the following groups (1) laryngopharyngeal fistulas, (2) tracheo esophageal fistulas, (3) broncho esophageal fistulas, (4) tracheobroncho esophageal fistulas, and (5) pleuro esophageal fistulas From the etiologic pathogenic point of view they may be classified as (1) neoplastic, (2) congenital, (3) specific infectious, (4) non specific infectious, and (5) traumatic fistulas, and (6) fistulas of undetermined origin Cancer is the cause of esophageal perforation in from 38 to 58 per cent of the cases

Campani reports the case of a woman forty two years old in whom roentgen examination disclosed a communication between the esophagus and the respiratory passages This case is interesting because the symptoms were relatively mild The contrast substance was seen to enter the respiratory passages and fill the right posterior base of the lung through a small perforation of the esophageal wall located about at the level of the junction between the eighth and ninth dorsal vertebrae Its apparent penetration into the lung did not produce the violent symptoms that have been reported by others

German roentgenologists prefer to administer a colored substance by mouth In presence of a fistula a cough is produced and the colored substance is expectorated

In trying to explain the rather abnormal course of the case he reports, the author concludes that, as the possibility of luetic infection was ruled out, the lesion was congenital since in early childhood the patient had frequent convulsive attacks of coughing following the ingestion of liquid food

The article contains a number of roentgenograms

RICHARD E. SOMMA, M.D.

Grilli, A. Roentgenological Visualization of Esophageal Varices and an Increase of the Shadow of the Azygos Vein in Portal Stasis (Indagine radiologica delle varici esofagee ed aumento dell'ombra della vena azygos nella stasi portale) *Radiol med.*, 1936, 23, 105

The roentgenological picture of esophageal varices was first described in 1928, by Wolf According to Wolf's description, it shows filling defects which may disappear and re appear at the same place circular and clover leaf like areas of decreased

density, an increase in the emptying time of the esophagus, and lodgment of bits of the opaque medium along the esophageal wall

The author found that of sixteen patients with portal obstruction, ten presented roentgenographic evidence of esophageal varices In six, the shadow of the azygos veins was enlarged, in 2, these veins showed no enlargement, and in two they could not be identified

It has been repeatedly stated in the literature that visualization of esophageal varices is associated with considerable difficulty Grilli suggests that roentgenograms of the esophagus be taken in the antero posterior and lateral views

Preliminary fluoroscopy is essential to determine the degree of rotation of the patient and to identify the azygos vein which is always to be seen on the screen The barium meal must not be too dense Grilli uses a mixture of barium and starch

Esophageal varices obliterate the normal pattern of the mucous folds of the esophagus Instead of the normal linear arrangement of these folds, there appear filling defects with a circular outline and tortuosities which frequently suggest the presence of dilated and engorged blood vessels Varicose nodes may be often recognized The margins of the esophagus are not regular but show variously shaped filling defects

Of fundamental importance is the fact that, in spite of these changes which often suggest the presence of an infiltrative process, the esophagus retains its contractility and elasticity and the peristaltic waves progress from above downward without interruption

Particularly in advanced cases the esophageal lumen is increased The author has observed also an ampullary dilatation of the lowermost portion of the esophagus Like Wolf and others, he has noted that, in presence of varicosities, the bolus traverses the esophagus very rapidly

Following the rupture of a varix, small hematomas may form alongside the esophageal wall The differential diagnosis is not difficult if the fundamental facts mentioned by Wolf are kept in mind The most important conditions from which esophageal varices must be differentiated are (1) gas bubbles due to the swallowing of air, (2) peristaltic waves, (3) chronic inflammations of the esophagus, (4) malignancy, which is readily diagnosed because of the absence of contractility and elasticity of the esophagus, and (5) gastroduodenal ulcer with hematemesis and melena

The author emphasizes that negative roentgen findings do not exclude the presence of esophageal varices because if the latter are smaller and flatter than the mucous folds their detection will be very difficult, if not impossible RICHARD E. SOMMA, M.D.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Burdick C G The Use of Living Fascial Sutures in the More Difficult Abdominal Hernias *Surg Clin North Am* 1936 16 83

The repair of large abdominal hernias is a difficult problem. Many surgeons advocate the use of living fascia. The most difficult to close are defects in incisions for gall bladder operations and hernias in the lower midline the lower margin of which is formed by the symphysis pubis.

The average incisional hernia can usually be cured with fascial sutures. As it is impossible to obtain firm union between the fascial flaps if the peritoneum intervenes the peritoneum and transversalis should always be closed separately. When this is done the flaps are not overlapped and the edges are approximated with less tension. Many ventral hernias can be repaired if the muscles are sutured separately with fascial strips.

In larger defects fascial sutures are not sufficient and the suture line must be reinforced with a free fascial flap. Before the operation the patient should be kept in bed on a light or liquid diet and free catharsis should be continued for several days. The fascial flap should be taken from one thigh and the fascia for the suture from the other. The author advises suturing the flap with fascial sutures rather than with catgut. He describes the method of Gallie in which the ends of the flaps are split to resemble a man's tailed binder and the ends are brought through and tied to those from the other side.

Wangensteen's method of transplanting a musculo-tendinous flap with its nerve and blood supply intact is described. Burdick uses silk rather than fine catgut to anchor the edges.

In a review of the results in over 1,000 cases of hernia repaired with living fascial sutures at the Hospital for the Ruptured and Crippled, New York City, it was found that the incidence of infection was higher than in cases in which catgut was used. Recurrences were more numerous than anticipated and in a considerable number of the cases re-operated upon little evidence of the previously used fascial sutures was found.

During the past year the surgeons at the Hospital for the Ruptured and Crippled have adopted the silk technique in many operations. They have been impressed with the satisfactory healing of the wounds and have found the incidence of infection lower. They have used silk for a few incisional hernias for which fascial sutures would have been employed previously. In the future they will use silk in preference to fascia in an increasing number of cases.

Burdick believes that for larger defects caused by sloughing of the abdominal wall the use of the fascial flap offers the best chance of permanent cure. He regards the Wangenstein method as the procedure of choice.

HARVEY S. ALLEN, M.D.

GASTRO INTESTINAL TRACT

Brule M, Hillemand P and Genestoux J M Angiomas of the Digestive Tract (*Les angiomes du tube digestif*) *Pres et med* Par 1936 44 632

Angiomas of the digestive tract were first observed by Rokitsansky in 1835 but few systematic studies have been made of them up to the present time.

Such tumors may be localized in one segment of the digestive tract or distributed throughout its length. In either case the lesions may be circumscribed or diffuse. The circumscribed lesions are sessile or pedunculated red or bluish masses whereas the diffuse lesions are plaques of vascular channels similar to the port wine stains that occur in the skin. Whether located in the stomach or intestine either form may be submucous or subserous or may infiltrate the entire wall of the viscus.

The neoplasms are also of a pseudo ulcerative or a pseudo neoplastic type. Those of the pseudo ulcerative type occur in the stomach, where they cause symptoms of peptic ulcer. Thirteen cases of such angiomas have been reported in the literature. Angiomas of the pseudoneoplastic type occur in either the stomach or large bowel and may suggest carcinoma.

Hemorrhage and anemia may be the only symptoms. When the hemorrhages begin in childhood a special type of infantile anemia results. Pernicious anemia may be closely imitated even to the megaloblastic reaction in the blood.

Occasionally acute intestinal obstruction occurs as the result of intussusception, volvulus or encroachment of the tumor on the lumen.

In some cases the angiomas are entirely latent so far as symptoms are concerned.

When the origin of any of the described syndromes is obscure the presence of external angiomas may suggest the correct diagnosis. A definite diagnosis can be made only by endoscopy or exploratory laparotomy.

The prognosis is grave. 60 per cent of the patients dying of chronic anemia or acute hemorrhage.

In most cases the treatment indicated is surgical since methods such as cryotherapy and diathermy are dangerous in the digestive tract. However when the angiomas are situated favorably sclerosing injections may be employed and irradiation is occasionally found to be effective.

ALBERT F. DE GROOT, M.D.

Magnant, J S Cardio-Esophageal Stricture Operation by the Abdominal Route End-Result (Rétrécissement cardio-oesophagien Intervention par voie abdominale Résultat éloigné) *Mém l'Acad de chir, Par, 1936, 62 761*

The case reported was that of a woman thirty years of age who developed dysphagia which progressed until, at first, no solid foods and finally not even fluids could be taken. Fluoroscopic examination showed a dilatation of the esophagus with a stricture in the cardiac portion through which only a little of the opaque medium passed in a very narrow band. At operation, the cardia and cardiac end of the esophagus were exposed by a median incision above the umbilicus. The pillars of the diaphragm were separated and sectioned and the esophagus was drawn down with careful liberation of all its attachments. An incision was then made into the muscular coat of the esophagus, but no plastic operation was done. An attempt was made to fix the esophagus to the pillars of the diaphragm. On the right side this was found to be impossible.

The patient made a good postoperative recovery and by the fifteenth day was able to take solid food. She remained well for six months on a normal diet. At the end of that time she began to have some slight difficulty in swallowing solid food, but was able to relieve it by taking fluids. There was no regurgitation of food. Occasional retrosternal pain at night was relieved by warm applications. Eight months after the operation, roentgen examination showed narrowing at the cardia, but the opaque medium passed much more freely than before, and there was definite peristalsis in the esophagus.

SOUPAULT, who reported this case for Magnant before the *Académie de Chirurgie*, stated that when the stricture of the esophagus is due to external causes, and especially when it is surrounded by a fibrous covering, Heller's procedure gives good results. Of eight patients operated upon by this method, seven were entirely relieved for a year or more.

In the discussion, BAUMGARTNER reported a case in which roentgen examination showed a dilatation of the esophagus above the diaphragm and a stenosis below the diaphragm. Through a median incision made above the umbilicus, the esophagus was freed and pulled downward and forward. A longitudinal incision was then made in its muscular coat, the mucosa being left intact. More than a year after operation the patient was well and taking a full normal diet without difficulty. ALICE M MEYERS

Wahren H The Intoxication in Intestinal Strangulation *Acta chirurg Scand, 1936, 78 121*

Experimental strangulation ileus in rabbits presents the picture of a state of intoxication rapidly leading to death. There is great likelihood that the acting substances are formed within the strangulated coil of intestine and enter the general circulation by way of the peritoneal cavity.

Histamin, acetylcholine, adenylic acid, and Fuler-Gaddum substance, all of which can be produced

from the body's own tissues and have a pronounced action on the vessels, probably do not play a part in strangulation ileus. It is possible that a markedly toxic but as yet not chemically identified substance obtainable from intestinal extracts, the effect of which *in vitro* and *in vivo* can be arrested by animal charcoal, is a factor of considerable importance in the production of that condition.

Moltke, O The Non-Specific Suppurative Inflammations of the Colon and Rectum on the Basis of 117 Cases (Die unspezifischen eitrigen Entzündungen des Dickdarms und Mastdarms auf Grund von 117 Fällen) *Nord med Tidskr, 1935, pp 1704, 1745*

Moltke reviews the disease pictures of the non-specific bloody suppurative inflammations of the colon and rectum. These conditions develop most frequently between the ages of twenty and forty years. Their cause is not yet known definitely. By the findings of his investigations Moltke has been convinced that they are not infectious diseases, as has been generally assumed, that, at any rate ordinary intestinal infections, such as dysentery and streptococcus infections, do not play a role in their development. The theory of an etiological relationship of such inflammations to nervous and functional disorders also appears to him incorrect.

Whereas the milder forms of inflammation of the colon and rectum of this type do not differ from other non-specific reactions of the colon to toxic influences (dysentery toxin, mercury, uremia) or to anaphylactic influences, the severe forms present a very characteristic pathologico-anatomical picture. They are characterized by a severe inflammatory process with a great loss of substance due to ulceration and extensive lesions of the mucous membrane. The larger ulcerations penetrate deeply into the mucous membrane, causing such destruction of the mucosa and submucosa that the tunica muscularis may be exposed. The author describes the microscopic picture in detail. He calls attention especially to the mononuclear and polynuclear infiltrations and edema of the intestinal walls. As the condition of the mucosa ranges from the normal to that in which there are dilated glands and a markedly suppurative infiltration into the tunica propria with a diffuse infiltration of lymphocytes and leucocytes, the histological picture also suggests a primary suppurative colitis.

To a certain degree, the clinical picture is determined by the site of the process. If the condition is located in the distal portion of the intestine there is obstipation, whereas in high colitis there is diarrhea. The first sign is usually hemorrhage. The blood lost may be pure or mixed with pus. Other signs and symptoms are slight lassitude with anemia and tenesmus. Not infrequently, Moltke has noted variations in the temperature and a tumor like thickening in the iliac fossa which, on rectoscopic examination, suggests an extensive, severe, edematous inflammation of the mucous

membrane. Worthy of note is a marked tendency toward mucous membrane hemorrhages which are often described as hemorrhages due to diapedesis.

Proper treatment may result in remissions but there remains a marked tendency toward recurrence. The author observed recurrences in 66 of 95 cases. The truly malignant ulcerative colitis begins acutely or insidiously with rectal tenesmus and slight fever. Its later stages are characterized by the appearance of blood and pus in the stools frequently accompanied by severe flatulence and meteoric distention of the abdomen, a septic temperature and increasing symptoms of peritoneal irritation. After a period of weeks or possibly months death results from pneumonia, general intoxication or peritonitis. As rectoscopic examination reveals all transitions from the slightest to the most severe forms, the author is opposed to drawing a sharp line between benign colitis and malignant colitis with suppurative proctitis. Roentgenography may facilitate the diagnosis.

Of the 117 cases reviewed by Moltke, 36 were fatal. Therefore the prognosis as to life must be guarded. The outlook for complete cure is also unfavorable.

The purpose of surgical treatment is to exclude the diseased portion of the intestine. The procedures to be considered are appendicectomy, cecostomy and colostomy. The mortality is high. Of the author's 19 patients 11 died. Local treatment is given by the rectal administration of antiphlogistic and antiseptic remedies (chamomile tea, acriflavin, bismuth, yatrien, mercurochrome and Besredka's antivirul). Large enemas may not be harmless. Yatrien seems to act particularly well in mild cases. The general treatment includes vaccino-therapy, serotherapy and hemotherapy. In serotherapy streptococci, dysenteric, and normal serum are injected. It is said that serotherapy may yield exceptionally good results. In hemotherapy blood transfusion and autohemotherapy are used. By and large, the efficacy of conservative treatment has not yet been definitely established.

(HAGGEN) LOUIS NEURELT M.D.

Greco T. Experimental Inversion of the Colon and Small Intestine for Plastic Purposes (*L'inversione del colon e del tenue a scopo plastico*) *Policlinico* Rome 1936 43 sez. chir. 195.

Resections of the human colon are being performed in a variety of conditions such as traumatic lesions, colitis, chronic intestinal stasis, tuberculosis, lymphogranulomatosis, obstruction, volvulus, recto-colic polyposis and diverticulitis. While in some cases the results have been satisfactory, colonic surgery involves considerable risk and presents various difficulties.

In an attempt to avoid the formation of an artificial anus, Nicoladoni in 1887, devised an operation in which the resected portion of the colon was replaced by a resected loop of the ileum left attached to the mesentery from which it derived its

nutrition. He called this operation an "enteroplasty." Later, he proposed a second operation which may be described as follows:

After resection of the colon a sufficiently long loop of ileum near the ileocecal valve is divided by a simple incision, its proximal end anastomosed to the superior stump of the colon and its distal end anastomosed to the inferior stump of the colon sigmoid or rectum.

After this procedure the course of the intestinal contents is reversed. The contents pass from the ileum into the colon, ascend the colon in an antiperistaltic sense and then pass through the ileocecal valve into the ileum whence they are conveyed into the lower stump of the colon.

Nicoladoni attributed the success of the operation to the possibility of a permanent reversal of peristalsis over a large portion of intestine. However this has never been demonstrated and the literature presents practically no information on the work done along these lines.

Greco attempted to perform the operation on five dogs. However instead of resecting portions of the colon he limited himself to simple colonic transections. Four of the dogs died soon after the intervention but one of them survived for fourteen months.

Microscopic examination at necropsy showed that the anastomosed ileal loop had an aspect similar to that of the colon. Sections of the colon taken at the level of the superior anastomosis presented a marked thickening of the tunica muscularis. Some of the epithelial cells of the mucosa and the glandular epithelium were undergoing degeneration. Near the cecum the inverted ileocecal loop showed a lymphoid infiltration. The entire segment of the small intestine showed a low epithelium. Villi were absent. At the level of the anastomosis between the ileum and rectum there was an area of marked glandular hyperplasia. RICHARD E. SOMMA M.D.

Charrier A, Lange J, Laumonier P, and Ferradou M. Two Cases of Volvulus of the Cecum Dehors. Cecostomy. One Cure and One Death on the Tenth Day from Acute Pulmonary Edema (*Deux cas de volvulus du caecum Dehors. Cecostomie. Une guérison et une mort au dixième jour par œdème aigu du poumon*) *Bor. de chir.* 1936 p. 137.

Case 1. The patient, a man fifty-five years old, was suddenly seized with violent abdominal pain, vomiting and obstipation. Examination thirty-six hours later revealed hyperresonance and slight rigidity of the right half of the abdomen. There was no history of previous abdominal symptoms, but three years before this attack a thoracoplasty had been performed for pulmonary tuberculosis. A diagnosis of acute intestinal obstruction of unknown cause was made.

At operation, the cecum presented itself in the incision. It was enormously distended and its surface was mottled with ecchymotic spots. Because of

rotation of the right colon from below upward, the fundus of the cecum lay in the subhepatic region. Much of the small intestine was found in the right parietocolonic gutter. The volvulus was reduced and a cecostomy established. Sudden death from edema of the lungs occurred on the tenth postoperative day.

Case 2. The patient was a woman fifty four years old who entered the hospital with symptoms and signs of intestinal obstruction of two days' duration. The onset had been sudden without premonitory symptoms. On examination, a resonant spherical swelling was found in the left hypochondrium. X-ray examination without preparation revealed a greatly dilated intestinal loop. This was believed to be a twisted sigmoid, but a barium enema filled the colon and was seen to surround the dilated loop.

At operation, the cecum was found dilated to the size of a man's head and rotated with a portion of the ascending colon into the left hypochondrium. The mass of small intestine lay entirely to the right of the volvulus. The axis of rotation was at the level of the ascending colon, where fixation to the posterior abdominal wall began. Here a thick fibrous band passed in front of the colon and, with the pedicle of the mass of small intestine, had caused the obstruction. The volvulus was reduced and a cecostomy performed. Recovery was uneventful.

Volvulus is usually the result of one of two types of lesions: congenital (abnormal mobility of the ileocecal loop), or inflammatory (postoperative adhesions or adhesions due to peritonitis). It is twice as frequent in males as in females. As a rule the acute occlusion is preceded by constipation and subacute attacks of obstruction.

For an accurate etiological diagnosis a roentgen study is essential. If this is carried out prudently, it is without danger.

One of three procedures may be employed in the treatment of cecal volvulus, namely (1) simple detorsion, (2) detorsion followed by cecostomy, and (3) right hemicolectomy. Even though the cecum is evacuated, the first of these results in cure in only 57 per cent of cases. The second is the best treatment for most cases, resulting in cure in from 59 to 75 per cent. Hemicolectomy is usually employed only when there is necrosis of the bowel. It results in cure in about 42 per cent of cases. As its mortality is only a little higher than that of detorsion followed by cecostomy, the authors believe its indications should be broadened to include all cases in which there is any doubt whatever regarding the vitality of the bowel. ALBERT F. DE GROOT, M.D.

Milone, S. The Surgical Treatment of Carcinoma of the Rectum (La cura chirurgica del carcinoma del retto). *Arch. ital. di chir.*, 1936, 43, 1.

The surgical treatment of carcinoma of the rectum should be as radical as the conditions warrant. Operability should not always be determined from the clinical evidence alone. When there is doubt regarding the possibility of removing the lesion, an

exploratory laparotomy or perineotomy may be justifiable.

Careful pre-operative preparation is important. The author's patients who are to undergo a radical operation, particularly those who are to be subjected to an abdominoperineal procedure, are prepared by a period of rest, injections of polyvalent antityphoid vaccine, and rectal irrigations of very dilute potassium permanganate.

For removable lesions, a one stage abdominoperineal amputation of the rectum with lowering of the sigmoid to the perineum is to be recommended unless the condition of the patient contra indicates the risk of this procedure or the malignant process is situated sufficiently low in the rectum to permit wide amputation by the perineal route. The perineal operation is applicable also in certain cases in which the lesion is situated higher in the intestine and the risk of the combined procedure is unwarranted.

Milone reserves the formation of an iliac anus for cases in which radical operation is not feasible and those in which the perineal anus is not functioning properly after radical surgery. He claims that in cases of occluding carcinoma of the rectum the formation of a cecal fistula is more rational than the formation of a left iliac anus since, after the former, there is a greater choice of methods for removal of the rectum. CLAUDE F. DIXON, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Jaki, J. The Liver-Function Test with Insulin, Water, and Glucose in Surgical Practice (Die Leberfunktionsprüfung mit Insulin-Wasser-Zuckerbelastung in der chirurgischen Praxis). 60 Tag d. deutsch. Ges. f. Chir., Berlin, 1936.

Aside from disturbances of the emptying and outflow of the bile, the disturbances which are of the greatest surgical significance with regard to the multiple functions of the liver are those of carbohydrate metabolism. The Althausen-Morawitz insulin-water sugar tolerance test seems to meet the surgical requirements. The author deviated from the original method in that he observed also the excretion of water.

From the blood sugar curve, manifestations of hypoglycemia, or urinary excretion, or from all of these three factors together, conclusions may be drawn with regard to hepatic disturbances and insufficiency. In the study of the blood sugar curve, consideration of the difference between the fasting and minimal hypoglycemic values is not sufficient. The course of the hyperglycemic portion of the curve and the degree and duration of the hyperglycemia must also be considered. However, their interpretation gives rise to very great difficulties because, among many other factors, the function of the pancreas and the relation between the pancreas and liver play an important rôle in their occurrence. The form of the hyperglycemic phase of the curve and the duration of the hyperglycemia are influenced by the function

of the pancreas. The difference between the fasting and minimal blood sugar values is subject to great variations and very irregular changes and as other organs are involved in addition to the liver definite conclusions as to liver function cannot be drawn from this difference alone. The hypoglycemic manifestations, including the temperature are very individual. Their occurrence is generally not related to certain blood sugar values in a definite phase of the hypoglycemic period. They are often absent at abnormally low blood sugar levels and sometimes are prolonged and marked at relatively high levels. However in spite of the variation in their appearance and the influence of extrahepatic factors it seems that hypoglycemic symptoms indicate an insufficiency of glycogen in the liver.

Water excretion is considered to be normal when under insulin treatment urinary excretion is markedly inhibited in the first hour and diuresis is greatly increased in the second hour. Under certain conditions the inhibition may fail to occur or last too long. In the former event there is an increased urinary excretion in the first four hours and the quantity of urine exceeds the water intake. The cause of altered water excretion is to be sought in the condition of the intrahepatic and extrahepatic hormone activities and changes in the function of the islands of Langerhans and the adrenals. The insulin water glucose tolerance test cannot be considered a specific test of liver function as numerous extrahepatic factors may also be involved in the causation of the phenomena produced by the test. The test is too complicated for daily surgical practice and the interpretation of its results is very difficult. However, from its results and other observations considered together an impression of the carbohydrate metabolism and the water economy of the organism may be obtained. By this means it is possible to obtain also more or less information as to the liver function. The recognition of impairment of carbohydrate metabolism is important from the standpoint of preoperative prophylactic management and prognosis. However the test is not suited for the demonstration of circumscribed liver changes such for instance as liver metastases.

(J. JAKI, LEO M. ZIMMERMAN, M.D.)

Bombi G. *A Study of the Histological Changes in the Liver in Chronic Appendicitis. A Contribution to the Knowledge of So Called Satellite Hepatitis.* (Studio delle alterazioni istologiche del fegato nella appendicite cronica quale contributo ad una migliore conoscenza delle cosiddette epatiti satelliti.) *Arch. ital. di chir.*, 1936 43: 149.

During the last few years various observers have called attention to the frequent association of histological changes in the liver with inflammatory conditions of the biliary passages especially calculous and non-calculous cholecystitis. It has been claimed that in such conditions there is always a diffuse alteration of the hepatic parenchyma. The following lesions have been described:

1. **Interstitial lesions.** These may be of the infiltrative or proliferative type. Both are localized chiefly in the biliary portal spaces and are less pronounced in the interlobular stroma. The interlobular supporting tissue has always been found normal. The paravascular infiltrations usually consist of lymphoid elements with a few neutrophils and occasional eosinophiles. No vascular lesions are observed in either the portal radicles or the central veins. In only a few cases is there a proliferation of the biliary capillaries.

2. **Parenchymatous lesions.** These are less constant than interstitial lesions and usually manifested by a slight cellular degeneration. Most common is fatty degeneration which is easily detected with Sudan III. Other changes are pigment infiltrations, protoplasmic vacuolization, and nuclear changes. Necrosis and cirrhotic changes have never been observed.

3. **Capsular lesions.** Capsular lesions are present in about 50 per cent of cases. They are manifested by a thickening of Glisson's capsule due to an increase of the connective tissue.

These lesions seem to show that there are intimate and direct anatomical and functional relations between the gall bladder and the hepatic parenchyma.

In cases of hepatitis associated with chronic appendicitis the paravascular infiltrations seem to be localized almost exclusively in the portal spaces a fact which seems to indicate that there is a pathological relationship between the appendicitis and the hepatic reaction. Bacteria and toxins of intestinal origin seem to be transported to the liver directly.

The author concludes that histological changes similar to those observed in the liver in cases of cholecystitis may occur also in inflammatory processes of other abdominal organs especially inflammatory reactions in the territory of distribution of the portal vein. **RICHARD E. SOMMA, M.D.**

Brandberg R. *Investigations on Splenomegaly. Cirrhoses of the Liver. So Called Thrombophlebitic Splenic Tumors and Chronic Infectious Splenic Enlargements with Special Regard to the Pathogenesis and the Results of Treatment by Splenectomy.* (Untersuchungen ueber splenomegale Leberzirrhosen sog. thrombophlebitische Milztumoren und chronisch infektiöse Milzvergrößerungen. Unter besonderer Berücksichtigung der Pathogenese und der Behandlungsergebnisse bei Splenektomie.) *Acta chirurg. Scand.* 1935 77: Supp. 40.

The author's material consisted of ninety seven cases in which splenectomy was performed in a large number of Swedish hospitals in the period from 1909 to 1933. Thirty six were cases of splenomegaly, cirrhosis of the liver. In this group two types were distinguished. The first type was characterized by signs of stasis of the portal circulation particularly hemorrhages from the alimentary canal and ascites. As a rule these signs indicated severe injury of the liver. The liver was often reduced in size and there

fore not palpable. The splenic enlargement was due to congestion. Fewer women than men were affected. The chief benefit from splenectomy was reduction of the portal blood flow. The pathological liver process remained unaffected by the operation. When the clinical symptoms indicated serious circulatory changes of the liver the prognosis for results from splenectomy was poor as the liver condition progressed and was fatal. Of twenty one patients who showed pre operative signs of stasis in the portal circulation, twelve died in the hospital, three soon after their discharge, and the others from two to nine years after the operation with symptoms referable to the primary disease. Only two were benefited by the intervention. However a good general condition and good results of functional tests may justify splenectomy as a palliative measure.

The second type of liver cirrhosis showed no signs of circulatory disturbance in the portal flow. In the cases of this type the splenic enlargement paralleled the hepatic change and was due to chronic infection or intoxication. The hepatic changes were often slight although the liver was usually enlarged. There seemed to be a certain contrary relationship between the degree to which the liver and the spleen were primarily attacked. When the liver was strongly attacked, the spleen was injured to a less extent, and vice versa. Anemia, both with and without increased hemolysis, was not uncommon. Most of the patients with this type of cirrhosis were women of middle age. Seven patients are still alive from three to fifteen years after the operation. Of these, four are well, two were benefited, and one was not benefited. The liver changes did not progress because they were mild at the outset. The splenectomy was probably not of much importance in their arrest. The possibility of improving the blood changes by splenectomy is doubtful. In this respect the outlook was best in the cases without pronounced anemia before the operation and less favorable in those with such anemia.

The second group of cases reviewed were thirty with obstruction of the portal stream in the absence of liver cirrhosis. In some of these it was clinically difficult to determine whether the obstruction to the circulation was due to the liver cirrhosis or to other changes. In three cases clinical signs of circulatory disturbances were absent, but the presence of such disturbances was established by the detection of thrombi in the portal system. Eleven of the patients were under sixteen years of age. In several cases the exact nature of the obstruction could not be determined. Thromboses and similar obstructions were difficult to detect at operation, and unchanged hilar vessels in the extirpated spleen obviously did not exclude thrombi or other obstructions. In all of the cases in which the conditions were determined, the obstruction was due to thrombosis of the portal or splenic vein. Of ten cases in which autopsy was done, thrombosis of only the splenic vein was found in four and thrombosis of the portal vein with or without associated splenic

thrombosis in six. In another case the obstruction to the circulation was evidently due to the pressure of pericarditic indurations on the hepatic veins. In no case could it be proved that hemorrhage occurred although there was no anatomically demonstrable factor to prevent it. A reduction in the size of the spleen after hemorrhage occurred in twelve cases, eight of which were those of adults. In most of the cases in which the cause of the disease could be determined the thrombosis was the primary change and the splenic enlargement occurred secondarily as the result of stasis. However, in two cases the hematological changes suggested that the splenic enlargement was primary and the thrombosis secondary.

After splenectomy, twelve of the patients in this group died in the hospital or immediately after leaving it, eight died during the next eight years of hemorrhage or intestinal gangrene, one died of a special complication, and one could not be traced. Eight patients are living and free from symptoms from two to fourteen years after the operation. The prognosis is better for children than for adults. All of the patients who had recurrences died sooner or later. The frequency of recurrence is due to the tendency of the thrombosis to recur and progress.

The operative indications in cases of this type are difficult to determine. It appears that in the cases of children, in which the results are rather good, operation should always be performed. Operation is recommended also for older patients with a good general condition. In the cases of older patients in poor general condition it is contra indicated because of its high mortality and the poor prospect of a lasting result.

The third group of cases reviewed were thirty one of chronic infectious enlargement of the spleen. Twenty five of the patients were women, most of whom were middle aged. Symptoms of stasis of the portal flow were absent. Next to the splenic enlargement, the most common findings were anemia and leucopenia. The latter were often associated with pronounced granulocytopenia. Thrombopenia was sometimes found. The results of splenectomy did not show whether the blood changes were caused by the spleen or by direct injury of the bone marrow by the pathogenic agent. In several cases the blood changes disappeared after splenectomy, but in others, especially those in which they were most marked, they were affected little, if at all, by the operation. If the cause of the disease cannot be eliminated, the blood changes persist whether the spleen is removed or not. Several cases showed a distinct tendency toward infection both before and after the splenectomy. Most of the deaths were due to infectious diseases. The cause of the susceptibility to infection is evidently the blood changes, especially granulocytopenia. There is apparently no sharp line of demarcation between chronic infectious enlargements of the spleen and acquired hemolytic icterus.

After splenectomy in the third group of cases, six patients died in the hospital, nine died after

leaving it seven were completely cured eight were benefited, and one was not benefited. The extremely enlarged spleen in cases of this type should be extirpated, although the result is questionable at times. If it is not removed it may lead to the severe sequelae causing circulatory disturbances of the portal circulation.

A common feature of these diseases is splenic enlargement with a histological picture indicating that it is due to irritation of the organ. Sometimes the enlargement is the result of stagnation of the portal flow caused by cirrhosis of the liver, thrombosis or other obstructions to the circulation. In other cases it is produced by chronic infection or intoxication. In splenic enlargement due to stasis microscopic examination usually reveals indurative changes of the reticular connective tissue especially in the pulp and proliferation of connective tissue in the capsule and trabeculae. In splenic enlargement due to intoxication the principal change is usually a hyperplasia (without induration) of the reticular elements of the pulp.

A comparison of the three groups of cases reviewed refutes the theory that chronic infectious splenic enlargement leads to cirrhosis of the liver or frequently gives rise to thrombosis of the splenic or the portal vein. Indirectly it indicates that in splenomegalic cirrhoses of the liver the liver and spleen can be injured independently and that in so-called thrombophlebotic enlargements of the spleen the thrombosis is usually primary and the splenic enlargement is caused secondarily by stasis.

Thrombosis of the superior mesenteric vein with gangrene of the small intestine occurs principally in cases with portal stasis.

In none of the reviewed cases did removal of the spleen lead to polycythemia or an appreciable reduction of resistance to infection.

LOUIS NEWELL M.D.

Möller W. Resection of the Liver for Cancer Metastases Followed by Local Freedom from Recurrence for Six Years (Leberresektion wegen Krebsmetastase sechs jahre lang lokale Rezidivfreiheit) *Acta chirurg Scand* 1936 73 103

The case reported was that of a woman twenty-nine years old who over a period of ten years, had been subjected to repeated laparotomies for recurrent ovarian tumors with secondary malignant degeneration and from whom a liver metastasis the size of a fist was removed by resection of the liver. About eighteen months after the operation on the liver a portion of the small intestine was removed on account of its invasion by a secondary deposit the size of a fist, from an ovarian tumor. At the same time, a secondary tumor the size of a walnut was removed from the anterior abdominal wall.

Six years after the operation on the liver the patient was able to work and showed no signs of recurrence or metastases.

Microscopic examination showed all of the tumors to be granulosa-cell carcinomas.

The author discusses the malignancy of the tumors and reviews experiences to date with resection of the liver for primary and metastatic cancer.

Branch C D and Zollinger R. Acute Cholecystitis. A Study of Conservative Treatment. *New England J Med* 1936 214 1173

The authors review 235 cases of acute cholecystitis treated at the Peter Bent Brigham Hospital, Boston. Immediate operation was performed in 34 (14.4 per cent) and operation preceded by conservative treatment for an average of four and seven tenths days in 193. In 6 cases operation was not performed. Generalized peritonitis was found at operation in 6 (2.5 per cent). Cholecystectomy was done in 205 cases and cholecystostomy in 24. There were 27 deaths, 3 of which occurred in the cases in which operation was not performed. The total operative mortality was 10.7 per cent. In the cases of immediate operation the mortality was 20.5 per cent whereas in those of delayed operation it was 8.7 per cent.

In a survey of the literature the authors found that very few surgeons consider acute cholecystitis a condition requiring immediate operation. From the cases they review in this article they conclude that delay of operation for several days is of advantage as it gives an opportunity to improve the patient's general condition without danger of spread of the local process. **EARL C ROBINSON M.D.**

Flessinger N and Gothlie S. The Cholesterol Crystallization of Biliary Calculi (La cristallisation cholestérique des calculs biliaires) *Presse med* Par 1936 44 837

Flessinger and Gothlie state that in discussions of the formation of biliary calculi much importance has been attributed to the crystallization of cholesterol. However they believe that in the formation of biliary calculi man it does not play the primary rôle. Their experiments have shown that if human bile is kept in test tubes at a temperature of 37 degrees C. cholesterol is precipitated in the form of crystals but calculi are not formed. For the formation of biliary calculi instability of cholesterol is apparently necessary since animals such as rabbits, guinea pigs, and dogs in which the bile cholesterol shows marked stability, do not develop gall stones.

In the formation of gall stones in man, various factors play a part. At one time the chief factor was thought to be infection but now that cases of biliary disease are operated on earlier than formerly it has been demonstrated that infection is not invariably present with gall stones. The authors have found it in only 40 per cent of their cases. Others have reported its incidence as 50 per cent. While infection undoubtedly plays a rôle in some cases stasis is of more importance as it alters the physico-chemical equilibrium of the bile. Both stasis and infection produce inflammatory protein exudates in the gall bladder which favor stone formation.

The authors have examined sections of many biliary calculi under polarized light. They have

found that all cholesterol calculi, whatever their size, show a similar formation. The center is formed by a mass of organic matter—bilirubin and protein, sometimes infiltrated with calcium salts. From this center cholesterol crystals radiate like the spokes of a wheel. The rim is formed by calcium salts more or less mixed with the cholesterol.

From these findings the authors conclude that there are five stages in the formation of most biliary calculi: (1) the formation of a bilirubin protein mass, (2) hardening of the periphery of this mass by calcium bilirubinate with some deposition of cholesterol, (3) centripetal crystallization from the periphery toward the center, which invades the amorphous center slowly, (4) centrifugal crystallization from this center in the form of the spokes of a wheel, and (5) the formation of an outer covering of calcium salts sometimes mixed with cholesterol. It is therefore the calculus which determines the crystallization of cholesterol, and not the crystallization which primarily forms the calculus. In other words, the crystallization of cholesterol "consolidates but does not create" a biliary calculus.

ALICE M. MEYERS

Millbourn, E. On the Diastatic Conditions in Cases of Jaundice Due to Cholelithiasis, Acute Hepatitis, and Malignant Tumors. *Acta chirurg. Scand.*, 1936, 77: 513.

In 39 (53 per cent) of 74 cases of jaundice due to stone in the common bile duct increased diastase values of 512 or above were found in the urine. In 17 cases they were found for one or two days, and in 22 cases for three or more days. In 20 cases the increase was only moderate, the value not exceeding 2,048, while in 19 it was considerable, values of 4,096 or higher (highest, 65,536) being found.

Acute pancreatitis occurred in 13 (about 18 per cent) of the 74 cases. In 11 of the cases of acute pancreatitis the diastase content of the urine was increased. In 2, in which the test was made late, it was found normal. The increased diastase content of the urine in the 11 cases may reasonably be attributed to the acute pancreatitis.

In cholelithiasis with jaundice, acute cholecystitis appears to be of a certain, though not decisive, importance with relation to the diastase content of the urine. Cholangitis is of no noteworthy importance. The duration of the jaundice appears to be of considerable, though not decisive, importance, an increase in the amount being more common at the beginning of the jaundice (the first two days) than when the jaundice has been present for three days or longer.

The occurrence of acute pancreatitis or of an increase in the amount of diastase in the urine in cholelithiasis with jaundice appears to depend to a considerable degree on the site of the concretion in the duct and the anatomical interrelations of the biliary and pancreatic ducts. The size of the concretion and the presence of one or more calculi in the common duct, whether impacted or not,

appear to be of a certain though not decisive importance in the diastase content of the urine.

An increase in the diastase content of the urine in cholelithiasis with jaundice is usually associated with pain or attacks of pain, but may occur also without pain at any time in the course of the disease or independently of attacks of pain. Moreover, in cases in which such an increase is associated with pain on one or more occasions it may occur at other times without pain, and pain may occur without an increase in the diastase content of the urine.

There seems to be no definite difference in the clinical aspect of cholelithiasis with jaundice whether the diastase content of the urine is increased or not.

In 3 (about 11 per cent) of 28 cases of jaundice due to certain or probable acute hepatitis which were seen at the Lund Clinic, the diastase content of the urine was increased to 512 or higher. In 2 of these cases the increase persisted for two days and in 1 case for nine days. In none of the 3 cases did the values exceed 1,024.

In cases of jaundice in which there is doubt as to whether the condition is due to a stone in the common duct, a malignant tumor, or acute hepatitis, an increase in the diastase content of the urine to 512 or higher is of certain, even though limited, diagnostic value as such an increase occurs in somewhat more than one half of all cases of cholelithiasis with jaundice, somewhat more than one fourth of all cases of tumor with jaundice, and in about one tenth of all cases of hepatitis with jaundice. If the increase is to 4,096 or higher or if an increase to 512 or higher occurs for more than two days, the diagnosis of cholelithiasis can be made with considerable certainty.

Wertz, E. A Discussion of the Clinical Characteristics and Diagnosis of Pancreatic Carcinoma on the Basis of Thirty-Two Cases Observed at the Surgical Clinic of the University of Giessen (Zur Klinik und Diagnose des Pankreas Carcinoms. *An Hand von 32 Fällen der chirurgischen Universitätsklinik Giessen*). 1935. Giessen, Dissertation.

The average age of the patients whose cases are reviewed by the author was fifty five and one tenth years. However, carcinoma of the pancreas may occur also in young persons. It is more common in males than in females. Twenty seven of the author's thirty two patients were males.

The cause of pancreatic cancer is not known. Among the factors to which the condition has been attributed are alcoholic abuses, gastric ulcers involving the glands, developmental anomalies and aberrant germ buds of the pancreatic ducts, pancreatic cirrhosis, gallstones, and chronic cholecystitis.

In two thirds of the cases the lesion occurs in the head of the pancreas. Of the cases reviewed, the head of the pancreas was involved in twenty-five, the entire pancreas in five, the body in one, and the tail in one.

Histological examination shows the tumor to be a scirrhous medullary or colloid cancer. According to their histological structure, pancreatic cancers may be divided as follows: (1) those arising from the epithelium of the efferent ducts; (2) those arising from the parenchyma of the gland; and (3) those arising from the islands of Langerhans. The islands of Langerhans offer great resistance to the carcinomatous process and still remain after there is nothing to be seen of the parenchyma of the gland. The necrosis of the fatty tissue is caused by steapsin.

The author describes the symptoms of carcinoma of the pancreas and discusses the methods of examination. The diastase values range between 32 and 256 Wohlgemuth units. However, an increase in the diastase values is not a sure sign of pancreatic disease. In the reviewed cases the values were increased and there was no decrease with the development of cancer cachexia. Blood sugar tolerance tests (Bernhard) showed a disturbance of the carbohydrate fixation capacity. In carcinoma of the pancreas the blood sugar curve rises rapidly and falls slowly. Recently roentgen examination has been found of aid in the diagnosis. However, as the diseased pancreas can be visualized by means of the rays only occasionally, it is usually necessary to study its effect on the neighboring organs. Certain conclusions with regard to pancreatic changes can be drawn from the roentgen shadows of the stomach and duodenum. Certain changes in the pars media of the stomach suggest changes in the body and tail of the pancreas. In some cases of pancreatic disease there are indentations of the greater or lesser curvature of the stomach. Certain changes in the pars pylorica suggest tumor formation in the region of the head of the pancreas. Pancreatic disease may be associated also with signs of stenosis or displacement of the duodenum. In general there are no findings which can be expected in every case. Of the cases reviewed roentgenologically demonstrable changes were found in only 2. With the aid of all of the methods of examination mentioned and the clinical findings it is occasionally possible to make a pre-operative diagnosis. As a rule, however, the diagnosis can be established only by operation.

The duration of the disease averages from six to eight months.

Palliative operations in cases with icterus are discussed. The prognosis of cancer of the pancreas

is unfavorable as it is extremely rare that removal of the tumor results in cure.

(RINTELEN) MATTHIAS J. SEIFERT, M.D.

MISCELLANEOUS

Sjoqvist O. The Use of Morphine After Laparotomies. A Pathologicophysiological and Clinical Study. (Ueber die Verwendung von Morphin nach Bauchoperationen. Eine pathologisch physiologische und klinische Studie.) *Acta chirurg. Scand.*, 1936 78 33.

After briefly reviewing the normal physiology of the intestinal tract the author states that not all intestinal movements are peristaltic. Peristalsis serves to propel the intestinal contents, whereas the rhythmic contractions or pendular movements act mainly as forces promoting the portal circulation. According to the findings of the author's experimental investigations, morphine does not paralyze the intestine but stimulates the pendular movements and the intestinal tonus.

Recent investigations have shown that the so-called postoperative paresis of the intestines is not a true intestinal paralysis. It is to be attributed to circulatory disturbances in the splanchnic area resulting in impairment of absorption and a transudation of gases and fluids toward the lumen. In part at any rate, this circulatory disturbance is due to inhibition of the pendular movements. Maintenance of these movements should therefore be one of the chief aims of treatment. When inhibition of these movements is overcome resorption of the fluid and gas forming transudate occurs. Forced mechanical emptying of the gut is harmful and unnecessary.

The author discusses the pre-operative and post-operative treatment of patients subjected to abdominal operations at the Seraphim Hospital, Stockholm. Before operation no laxatives, enemas, or aperients are given. Beginning with the day of operation, morphine is administered in large doses. During the period from 1929 to 1933 2,793 patients operated upon for abdominal conditions were subjected to this régime. The author discusses especially the cases treated in the period from 1932 to 1933, the clinical records of which include detailed data regarding the postoperative course. Cases of appendicitis and biliary conditions operated upon during these years are analyzed with reference to the incidence of so-called postoperative intestinal paresis.

GYNECOLOGY

UTERUS

Wilson, L., and Kurzrok, R. Excessive Uterine Bleeding of Functional Origin *Am J Obst & Gynec*, 1936, 31 911

Five types of functional bleeding are considered, namely, puberty, maturity, preclimacteric, ovulation, and cyclical or anovulatory. Menstruation is discussed from the viewpoint of the myometrium, the endometrium, the ovary, and the anterior pituitary gland. From selected cases of functional bleeding which they present the authors draw the following conclusions:

1. Functional uterine bleeding is completely independent of the type of endometrium.

2. Cystic and glandular hyperplasia of the endometrium persists long after the bleeding has stopped.

3. The cause of functional bleeding must be sought in some extra endometrial factor.

A theory based on the assumed presence of a bleeding factor (or hormone) in the anterior pituitary gland is suggested to explain both menstrual and functional bleeding. The treatment of functional bleeding with the pituitary like hormones obtained from pregnancy urine (Prolan A and B) is discussed. The authors state that the mechanism by which pregnancy urine extract controls functional bleeding has not been definitely determined. The absence of an effect on the endometrium demonstrates conclusively that the cessation of the bleeding cannot be attributed to luteinization. The authors believe that pregnancy urine extract acts directly on the anterior pituitary, causing inhibition of the bleeding hormone.

EDWARD L. CORNELL, M.D.

Bryan, W. A., and Trahue, C. C. Total Hysterectomy *Ann Surg*, 1936, 103 914

The thesis of this article is that total hysterectomy is preferable to subtotal hysterectomy provided its mortality can be kept as low as that of the subtotal operation. Among the reasons given is the usual one, that the stump left by subtotal hysterectomy may harbor malignancy at the time of the operation or develop malignancy later. The authors cite reports in the literature in which the incidence of malignancy in the stump left by subtotal hysterectomy is estimated at from 1 to 4 per cent. In addition to the threat of malignancy, they call attention also to the possibility of a disagreeable discharge and the growth of polyp after the subtotal operation.

They describe their technique for total hysterectomy and report 177 cases in which this operation was performed with a mortality of 2.8 per cent.

To prove that the mortality of total hysterectomy is not much greater than that of the subtotal opera-

tion they tabulate figures from many sources which show that 27,045 subtotal operations were performed with a mortality of 2.73 per cent and 8,442 total operations with a mortality of 3.28 per cent. They review the factors which influence these figures.

In the discussion of this report, CULLEN, ROBINS, NOVAK, and GRIFFITH expressed the opinion that the total operation is the more dangerous, that the subtotal operation is adequate for many cases, particularly if the cervix is in good condition, that the total operation would be inadvisable in the presence of difficult pelvic conditions unless it were specifically indicated, and that neither operation should be performed routinely. Among the objectionable results of the total operation, they cited shortening and dryness of the vagina.

DANIEL G. MORTON, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

McLellan, A. A Clinical and Pathological Study of Salpingo Oophoritis Due to Pyogenic Infection *J Obst & Gynec Brit Emp*, 1936, 43 460

The investigation reported was conducted in an effort to obtain information regarding the nature and the pathway of infection in selected cases of inflammatory diseases of the adnexa. These factors often remain uncertain even after careful study of the history and the pathological findings. Moreover, bacteriological examination of material removed at operation is disappointingly negative.

Forty one operative specimens of fallopian tubes and ovaries in which pus or exudate was present were studied in the hope that the infecting organisms might be identified. In only eleven specimens were bacteria found histologically. Gram positive cocci were discovered in five, Gram negative cocci in four, and Gram negative bacilli in two.

After careful gross and microscopic study of specimens it was concluded that early closure and distention of the fallopian tubes with disappearance of the fimbriae is a more distinctive feature of gonococcal infection than the histological picture. It was recognized also that when Gram positive cocci were the offending organisms, the infection was of puerperal origin. Under such conditions the tubes were not distended but only thickened, the fimbriae were free, and the ovaries frequently contained purulent collections.

Infection may spread from the lower to the higher levels of the genital tract by direct extension from the cervix to the uterine cavity, by way of the lymphatics in the parametrium, and as the result of involvement of the peritoneum through the lymphatics.

GEORGE H. GARDNER, M.D.

Vayssiere E. Mosinger, M., Cerati P. and Donnet V.
A Case of Tumor of the Ovary with a Mixed Endocrine Structure—Folliculoluteinoma (Sur un cas de tumeur ovarienne à structure endocrinienne mixte—folliculolutéinome) *Bull Soc d'obst et de gynéc de Par* 1936 25 321

According to their endocrine structure, tumors of the ovary are the following three types: folliculoluteinomas, luteinomas, and a mixed type which the authors call folliculoluteinomas.

The case of folliculoluteinoma reported in this article was that of a woman thirty-seven years old. The patient had never been pregnant. She had menstruated normally up to 1931 when she was thirty-three years old. Menstruation then stopped suddenly and she was amenorrhoeic for three years. At the same time heavy pain began in the left iliac fossa. In 1934 she began to have intermittent metrorrhagia. In the three-year period she gained 20 kgm in weight. The metrorrhagia finally became so copious that she sought treatment.

Examination disclosed a tumor the size of an egg in the left flank. At operation the neoplasm was found to be in the ovary. Its removal was followed by such severe hemorrhage that five days later, curettage became necessary. After the curettage uneventful recovery resulted.

Histological examination of the tumor revealed three kinds of tissue: (1) tissue characteristic of folliculoma; (2) tissue containing thick cords of cells resembling those of normal corpus luteum; and (3) tissue containing cells which were beyond doubt mesenchymatous, resembling the lutein cells of the theca interna. The mucosa of the uterus was very hyperplastic and rich in cells.

In conclusion the author says that further study is necessary to clear up the reactions of the uterus to ovarian tumors.

AUDREY GOSS MORGAN M.D.

Binet A. Ovarian Grafts (Les greffes ovariennes) *Gynécologie* 1936 35 193

Experimental investigations the findings of which have been wholly or partially confirmed by clinical observations have shown that the factor necessary for the successful taking of an ovarian graft is the need of the body for the hormone supplied by the graft. The graft will take in a young castrated subject, an old individual, or an individual with endocrine insufficiency. In clinical cases the grafts may be free or pedunculated, autoplasmic, homoplasmic, or heteroplasmic. According to Tuffier autoplasmic grafts take in 67 per cent of cases. The pedunculated graft would seem to be superior to the free graft, but its implantation is technically very difficult. In the author's opinion, the only condition in which it is indicated is sterility from obliteration of the tubes.

Ovarian grafts are indicated in hypoplasia, aplasia, and retardation of development of the genitalia; ovarian dysfunction or insufficiency; amenorrhea, dysmenorrhea, castration, senescence, ovarian and tubal sterility, and mental disturbances

of genital origin. In the author's opinion, their chief indication is the prevention rather than the treatment of disturbances caused by surgical castration. Removal of the genital organs of women is followed by more or less serious disturbances in 75 per cent of cases.

For successful results from autoplasmic grafting it is not necessary to implant a whole normal ovary. Normal parts of an ovary that are cystic or otherwise diseased may be used. The graft may be placed beneath the skin in the muscles in the abdomen or in the genital organs. It should always be placed in a location with a good blood supply. Binet prefers to implant it in the labium majus. This can be done by a slight operation under local anesthesia. The graft is placed, with its bleeding surface back, about 5 or 6 cm deep in the cellular tissue of the labium and the small skin wound then closed. Binet implants a graft in each labium.

Autoplasmic grafting is, of course, superior to either homoplasmic or heteroplasmic grafting. If a homoplasmic graft is used it should be obtained from a young and healthy subject.

Eventually all grafts undergo atrophy and absorption, but under normal conditions they have a beneficial effect in the meantime as they supply the hormone required by the patient to adjust herself to the changed hormonal conditions of the menopause and to regain hormonal equilibrium.

AUDREY GOSS MORGAN M.D.

MISCELLANEOUS

Le Lorier V. and Isidor P. A Complex Tumor of the Female Genitalia. Tumor of Genital Germinal Tissue (Tumeur complexe de l'appareil génital femelle. Tumeur du blastème génital) *Gynécologie* 1936 35 257

The authors observe that genital tumors may contain elements retaining an embryonic potential which may reproduce the morphological aspects observable in the course of organogenesis.

The case reported was that of a woman sixty-eight years old who had had a foul discharge for five months. The patient was married but had never been pregnant. Examination revealed a uterus the size of a two-month pregnancy which was of firm consistency on the right and a mass of similar consistency apparently lying in the right broad ligament. At laparotomy extensive intestinal adhesions were found and pockets containing serosanguinous and purulent fluid were opened on both sides with the escape of friable vegetative tissue. Both tubes and ovaries were removed and a supra-vaginal amputation of the uterus was done.

The uterus contained a large cauliflower growth. The right tube was enlarged toward its peripheral end and in appearance resembled a pyosalpinx. When it was sectioned a thin-walled cavity filled by a whitish tumor mass was found. The right ovary was slightly enlarged and cystic. The left tube was smaller than the right tube, but con-

tained a similar granular tumor. The left ovary was normal.

Microscopic examination of the tubes revealed a papillary growth similar to the vegetative ovarian tumors. Elongated cystic spaces lined by cells resembling endothelial cells, which suggested the epioophoron, and vegetations were found in the muscle layers. The surrounding stroma cells in some areas showed all transitions between the usual adult forms and the epithelial cells of the vegetative growth. Many of these cells looked like syncytial cells. Even on the peritoneal surface there were papillary proliferations.

The uterine tumor presented a varied picture. Close to its attachment to the myometrium it resembled the usual adenocarcinoma of the fundus. Farther out in the lumen it showed a more papillary structure resembling that of the tubes. The stromal cells varied from typical fibroblasts to epithelioid cells indistinguishable from the cells of the tumor proper. The lining of the uterus elsewhere than at the tumor site resembled wolffian epithelium. In the myometrium beneath the serosa there were a number of cystic spaces and deep indentations of the serosa suggestive of endometriosis. Here also the stroma was of an ambiguous character. On the surface of the right ovary there were similar epithelial cavities and serosal indentations with a similar sarcomatoid stroma in the neighborhood. Even on the extragenital peritoneum bits of vegetative growth similar to that in the uterus were found.

The authors believe that the evidences of organogenetic malformation and the varied character of the growth in different locations point, not to a single origin in the tubes with secondary invasion elsewhere, but to an embryonic growth of the renal blastoma type.

Numerous photomicrographs are presented.
DANIEL G. MORTON, M.D.

Hauser, R. Carcinoma on the Basis of Extensive Endometriosis (Carcinoma auf der Basis ausgedehnter Endometriose). *Ztschr. f. Krebsforsch.*, 1936, 43: 306.

Although the literature on endometriosis is very extensive, there have been few observations on the possibility of malignancy of ectopic endometrium. Cullen and De Snoo have each reported a typical case of the latter condition. Hauser reports a new case which is of particular value because of the detailed histological study. The patient was a woman thirty-two years old. Menstruation had begun at the age of fifteen. The bleeding was very profuse, continued for eight days, and recurred at intervals of three weeks. In spite of curettage performed one year after the menarche, the condition became worse. The bleeding continued for from eight to fourteen days and recurred at intervals of the same length. Irradiation of the spleen, Alpine sun therapy, and roentgen irradiation caused no improvement. After this treatment the intervals between the periods were about eight days longer, but the bleed-

ing continued to be as profuse as before. Finally, severe bleeding occurred continuously for four weeks.

When the patient entered the hospital she was found to have a high grade anemia. The uterus was enlarged and somewhat anteverted, and behind it a well defined tumor like thickening could be felt. Only sparse material was obtained on curettage. This showed relatively few gland ducts of varied form and size which were irregularly distributed in a preponderantly compact connective tissue stroma. The glandular epithelium was single layered. As the bleeding did not decrease and the hemoglobin was only 30 per cent, removal of the uterus was decided upon.

At laparotomy, the uterus was found to be considerably enlarged, rotated toward the right pelvic wall, and lifted out of the true pelvis by a well-defined, only slightly movable, tense elastic tumor more than twice the size of a man's fist. The neoplasm arose from the left posterior wall of the uterus and filled a part of the large pelvis on the left side. It was lightly adherent to the omentum and intestines, and consisted of a compact, pithy, white mass. A low supravaginal hysterectomy was performed with removal of the left ovary.

When the patient was re-examined three months later the hemoglobin was 50 per cent. Except for a little firm resistance in the left parametrium, the findings of gynecological examination were negative.

The extirpated uterus showed an irregular tumor arising on a broad base from its posterior wall and projecting into the uterine cavity as a polypoid structure which was white and solid, whereas the underlying muscle wall was finely honeycombed. Toward the external surface of the uterus there was a broad layer of normal muscle. Near the top of the fundus a small subserous myoma was found. Section through the irregular tumor and the honeycombed portion of the myometrium revealed endometrioid tissue which was still normal here and there but in many areas passed over to a primarily glandular and secondarily solid medullary carcinoma. Within the removed ovary a blood containing cyst was found, and on its surface there were warty papillary excrescences. Three photomicrographs are presented.

(SCHILLER) DANIEL G. MORTON, M.D.

Watson E. M. Carcinoma of the Female Urethra. *J. Urol.*, 1936, 35: 654.

The author states that since Ehrendorfer's study of carcinoma of the female urethra in 1899 the number of reported cases of the condition has gradually increased until recently. Menville and Counsellor were able to collect 149 cases which they regarded as authentic.

Growths originating from the mucosa lining the urethra may be epitheliomas of true mucous membrane origin. There is also the urethral papilloma undergoing the histological changes of malignant degeneration. Adenocarcinoma of the urethra, which is very rare, may arise from Skene's glands.

the glands of Littre or the few gland elements situated around the urethra. Combinations of these neoplasms, which are apparently mixed tumors of connective tissue and epithelial elements, also occur.

The author reports the results of a study of seventeen cases of carcinoma of the female urethra proved by section which were treated on the Urological Service of the New York State Institute for the Study of Malignant Disease. The ages of the patients ranged from thirty six to seventy years and averaged fifty two years. All of the patients had been married. Some of them had a positive Wassermann reaction. The symptoms were localized in the urethra, bladder, vagina, or back, and were of comparatively recent onset. In ten cases, hematuria or an irregular bloody discharge was the presenting symptom. In eight pain, burning and frequency, often associated with hematuria, had been prominent symptoms.

Watson says that the diagnosis of urethral carcinoma in the female should not be difficult. The simple papilloma form must be distinguished from caruncle, polyp, benign papilloma and leucoplakia with hypertrophy. All lumps, polyps or caruncles removed from the urethra should be examined for malignancy.

In the author's cases the treatment has consisted of (1) surgery (electrocoagulation or more recently excision with the cutting current) (2) high power x ray irradiation (3) the implantation of radium emanation or (4) some combination of these methods. Subsequent to excision of the tumor deep x ray treatments have been given usually two to the anterior pelvis and two to the posterior pelvis. When palpable glands are present in the groins these areas also are treated by x ray irradiation.

Cure lasting for four years and probably longer may be expected in more than 50 per cent of cases.

HERBERT F. THURSTON, M.D.

Seguy, J. An Etiological and Clinical Study of Sterility (*Etude étiologique et clinique de la stérilité*). *Rev. franç. de gynéc. et d'obst.* 1936 31 250.

The author divides this discussion of sterility into two parts, one dealing with the causes and the other with the diagnosis of the condition.

He states that involuntary sterility is present in about 15 per cent of marriages. It may be spoken of only when after three years of normal sex relations pregnancy has not resulted. Seguy summarizes the numerous causes of the condition, emphasizing particularly the more recent contributions on the subject.

He first discusses lesions of the genital tract, male as well as female. He states that sclerosis, a defense mechanism of the body against congestion resulting from infectious, hormonal stimuli and mechanical causes, occurs in both sexes. It may develop in any part of the genital tract, producing an obstruction to either the development or the liberation of ova or spermatozoa. Among its

numerous causes are infection (primary and hereditary syphilis, tuberculosis, acute general infections, appendicitis, gonorrhea) and poisons (lead, alcohol, morphine). Ectopic situations of the gonads prevent normal migration of the germ cells, especially in the male. Endocrinopathic factors such as pituitary, thyroid, adrenal, pancreas, ovarian and testicular hormone dysfunctions are also of importance. General nutritional disturbances may lead to ovarian or testicular degeneration.

A metabolic disturbance, particularly that shown in obesity, is an important factor in sterility, probably on a chemical basis. Recent studies showing a close relationship between folliculin, the male hormone and sterols (cholesterol) and hence with fats suggest a possible explanation. The male hormone has been synthesized from cholesterol, and the lutein hormone from a vegetable sterol, stigmasterone. Although cholesterol and fat are not chemically identical, they are closely related. Since the organism is capable of building up cholesterol from fats, the author believes that this fact may account for instances of apparent testicular or ovarian damage from excessive male or female sex hormones derived ultimately from fats. Vitamin E, shown to be of great importance in the fertility of rats, is closely related to fats and cholesterol and hence to folliculin. Vitamin A in excess disturbs the ovulation mechanism, and Vitamin B in excess arrests ovulation and produces follicle atresia.

Among the pathological states of the genital tracts of both sexes which may bring about sterility through obstruction are malformations (aplasia, dysplasia, hypoplasia) and various infections. Tubal occlusion was found in 45 per cent of cases examined by the author. In 15 of these tuberculous salpingitis was present.

Disturbances of physiology may also account for sterility in both sexes. Improper performance of the sex act (impotentia coeundi) is said by the author to account for 2 per cent of cases of male sterility. Vaginismus, the female counterpart, prevents insemination by preventing proper penetration. Spasm or undue relaxation of the pelvic muscles may cause expulsion or seepage of the sperm from the vagina after normal coitus. Alterations of the hydrogen ion concentration in the vagina (normal pH 4.5 to 5.2) may also play a part in sterility. Increased acidity destroys the sperm and decreased acidity decreases sperm motility. During certain days of the cycle the cervical canal contains a translucent watery fluid which is essential to maintain the viability of the spermatozoa. Absence or deficiency of this fluid results in sterility. In the author's opinion the Ogino-Knaus theory of a fertile and sterile period in the menstrual cycle based on ovulation time is incorrect. The sole criteria of fertility are permeability of the cervical canal and the presence of the protective cervical secretion. Tubal factors in sterility are atonicity, spasm, hyperexcitation states, extreme length and tortuosity of the tube. These interfere with migra-

tion of spermatozoa and ova. Once fertilization has taken place, sterility may still be brought about by failure of nidation due to abnormalities of the endometrium caused by infection, hormonal imbalance (folliculin or lutein excess or deficiency), or tumor formation (submucous fibroids). The author subscribes to the view that an endometrial hormone in some manner regulates ovarian function and that therefore a normally functioning endometrium is essential to normal ovarian function.

The diagnosis of sterility is difficult. Conclusions must not be drawn too quickly from the absence of positive findings, as hidden causes of the condition may be easily overlooked, and cure must not be promised after a demonstrable cause has been removed. The examination should include consideration of the histories of the husband and wife, sperm examination, testing of tubal permeability (transuterine insufflation, hysterosalpingography), investigation of the "physiological permeability" of the cervix (the presence or absence of the protective cervical secretions), investigation of ovarian function, and a meticulous search for hidden metabolic, serological, chemical, infectious factors. The author places little reliance upon the Knaus test for ovulation. Determination of the follicular or gonadotropic hormone content of the blood and urine are of some value though not absolutely reliable. Information regarding the lutein function of the ovary is best obtained by biopsy of the endometrium during the lutein phase.

In conclusion Seguy says that the complexity of the problem of sterility necessitates close cooperation between gynecologists, urologists, chemists, and physiologists. Only when the study is thus completely organized can further progress be expected.

HAROLD C. MACK, M.D.

Dubail, P. Tubal Insufflation and the Intra Uterine Injection of Lipiodol in Sterility. (*Insufflation tubaire et injection intra-utérine de lipiodol dans la stérilité*) *Bull. et mém. Soc. d' chirurgiens de Paris*, 1936, 28: 181.

The direct male factor in sterility, which is estimated to be responsible for the condition in from 25 to 30 per cent of cases, is frequently overlooked. Indirectly the male is responsible in 30 per cent of cases through the transmission of gonococcal infection to the female. In one third of the cases the condition is due to the female.

In sterility primary in the female uterine, tubal, and endocrine factors are involved. The uterine factors include malformations, uterine hypoplasia, cervical stenosis, anteversion, retroversion, endocervicitis, infectious endometritis, and cervical lacerations. Among tubal factors are gonococcal salpingitis, post abortion and postpartum salpingitis, and salpingitis secondary to appendicitis. Congenital impermeability of the tubes is rare. Endocrine sterility is due to improper function of the ovary, thyroid, and anterior lobe of the pituitary gland. Genital lesions are most common in secondary or acquired sterility, the majority are due to infection (metritis, salpingitis).

Tubal insufflation and hysterosalpingography are indicated especially in cases of tubal sterility and uterine malformations, deviations, and hypoplasia. As the tubes are physiologically impermeable during the premenstrual period, these procedures should be carried out during the first week after the menstrual flow. In the presence of uterine bleeding and infection, insufflation and lipiodol injection are contraindicated. The author describes the technique of both methods.

The chief dangers of insufflation are tubal rupture, which is rare if pressure does not exceed 200 mm., gas embolism, and respiratory syncope due to accumulation of the gas below the diaphragm. Infection is rare if the contra indications are heeded.

The dangers of hysterosalpingography are tubal rupture, uterine rupture, fat embolism, infection, and chemical intoxication. Functional disturbances due to irritation of a previously infected tubal mucosa by iodine have been reported. The occurrence of ectopic gestation after salpingography has been attributed to this procedure.

Both methods have been cited as being of therapeutic value in tubal sterility. The author is of the opinion that they are approximately of equal value. If insufflation shows the tubes to be patent, lipiodol injection is unnecessary. If the tubes are impermeable to gas, hysterosalpingography will show the site extent and occasionally the nature of the occlusion, thereby aiding the surgeon to correct the condition if this is possible. The accidents which may follow each method should not be ignored since any of them may seriously impair the possibilities of an ultimate pregnancy. Because of its greater dangers, lipiodol injection is no longer used as often as it once was. HAROLD C. MACK, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Villard E. Regad J. and Contamin R. *The Role of Endometrioid States in the Pathogenesis of Tubal Pregnancy* (Du rôle des états endométriaux dans la pathogénie de la grossesse tubaire) *Gynéc et obst* 1936 33 305

Now that the last word seems to have been spoken regarding the diagnosis and treatment of extra uterine pregnancy the authors believe it of interest to determine whether this is true also with regard to the etiology and pathogenesis of the condition. The multiplicity of the theories regarding the latter is evidence of their weaknesses.

The first factor to which extra uterine pregnancy was attributed was mechanical obstruction to the passage of the impregnated ovum. Such obstruction may be caused by compression due to pelvic tumors external to or within the tubes or by cicatricial bands, the sequelæ of inflammation. According to another theory the condition is due to a congenital malformation of the tubes such as hypoplasia or spiral or twisted tubes. The fact that hypoplasia is usually bilateral has been cited to account for the occasional bilateral occurrence of tubal pregnancy and its recurrence in the remaining tube. Among other congenital conditions held responsible are accessory diverticula causing arrest of the ovum on its way to the uterus.

It is believed by some that the cause of tubal pregnancy is to be sought in the ovum itself. In support of this theory it has been suggested that impairment of the vitality of the ovum by a general disease such as syphilis, tuberculosis or a diathesis may delay its passage through the tubes. Ovarian disturbances such as hyperemia and sclerocystic degeneration have been held responsible for the formation of malformed ova incapable of passing completely through the tubes.

Schneider Reimberg Romcke and others claimed that disturbances of tubal peristalsis may delay the progress of the ovum. However although they were able to present apparent roentgenological evidence of such disturbances anatomists believe that roentgenological phenomena of this type are due to spasms of the isthmus region. The authors are of the opinion that the severity and duration of such spasms are not sufficient to check the progress of the ovum through the tubes completely. Hypomotility of the tubes has also been suggested as a cause of ectopic pregnancy.

As to a possible effect of hormone disturbances on the migration of the ovum no definite conclusions have been reached. The activity of the ovary seems to play a rôle in tubal implantation of the ovum only by exerting an effect on tubal peristalsis. Cotte

and Kellar claim that in 10 per cent of tubal pregnancies there is an atypical development of the corpus luteum. It appears evident that while a hormone influence may not be the chief factor it is far from a negligible factor.

According to a theory which has been widely accepted ectopic pregnancy is due to inflammation causing collapse of the vibratory cilia of the tubal mucosa with resulting destruction of the agent for propulsion of the ovum. The validity of this hypothesis has been questioned by some as it has been shown that the ovum may become implanted in a normal tubal mucosa. However as a history of salpingitis is common in cases of ectopic pregnancy it must be admitted that inflammation plays an important rôle in the pathogenesis of the condition. Moreover, by a well known metaplastic mechanism inflammation may give rise to progressive transformations ending in what is known as endometrioid states.

All of these older theories have been more or less weakened by the advance in our knowledge of the intimate mechanism of implantation of the ovum. Recent studies have shown that the state of the mucosa plays an important part in the process and that the most favorable conditions for implantation are presented by the premenstrual or pregravid uterine mucosa. The mucosa of the tubes, when normal does not undergo menstrual changes to a degree sufficient for implantation. However under certain circumstances it may acquire a more or less marked resemblance to the uterine mucosa not only in its morphological characteristics but also in its physiological functions. It is this resemblance which characterizes the tubal endometrial states. The tubes may present an endometrioid or endometrial condition in which all requirements for implantation of the ovum are met.

The important part played by endometrial transformation of the mucosa in the occurrence of ectopic pregnancy is therefore evident. Among the various theories advanced to explain this transformation are the lymphatic theory the inflammatory theory the congenital theories and the endometrial theory advanced by Cullen and completed by the studies of Sampson. Meyer believes that under the influence of irritation the endothelial cells of the peritoneum may be transformed into cylindrical cells. None of these theories will explain all cases. The two chief causes of endometrioid transformation of the tubal mucosa are congenital affections and inflammation. Lahm believes it is due to congenital lesions pure and simple while Meyer is of the opinion that inflammation intervenes to develop lesions originally latent. Faulty congenital differentiation of the tubes has also been held responsible

Webster considers tubal dysembryoplasia a regressive anomaly

Decidual reaction is one of the most important physiological properties of endometrial mucosa. However, the endometrial mucosa, which is even more like that of true uterine mucosa, proceeds also to desquamation and hemorrhage, frequently resulting in a veritable hematosalpinx of an acute type and, even more often, in a chronic condition of "chocolate tube"

It is therefore evident that the old theories that congenital anomalies and inflammation are the chief causes of tubal pregnancy are valid only in the sense that these conditions may give rise to endometrial states, endometriosis, or endometrioma of the tubes, which alone provide the conditions necessary for implantation of the ovum. The endometrial theory explains perfectly all the peculiarities of extra uterine pregnancy in any location and permits the inclusion of all secondary causes of the condition. It is, moreover, the only truly physiological explanation

EDITH SCHANZLE MOORE

Baird, D. The Upper Urinary Tract in Pregnancy and the Puerperium, with Special Reference to the Pyelitis of Pregnancy. VI Pregnancy Complicated by Other Pathological Conditions of the Urinary Tract. *J Obst & Gynec Brit Emp*, 1936, 43 453

The author discusses the association of the following urological conditions with pregnancy (1) single kidney, seven cases, (2) congenital abnormalities of the urinary tract, seven cases, (3) hydronephrosis, four cases, (4) urinary calculus, ten cases, and (5) hematuria, fifty three cases

He states that the risks of pregnancy with a single kidney are not very great, but it is advisable to delay pregnancy for from two to four years after nephrectomy

Pyelography has shown that congenital abnormalities of the urinary tract, which are frequently symptomless, are much more common than was formerly supposed

While it has been claimed by some that pyelitis of pregnancy develops in women with an abnormality of the urinary tract, this is not correct

The reviewed cases of urinary calculus show that careful urological examination is necessary for a correct diagnosis as the urine was infected in all of the cases cited and, in four, pyrexia was present and the clinical picture was indistinguishable from that of pyelitis of pregnancy. In three cases the appendix had been removed without benefit. In three, there was hematuria and in one of these it was the only sign. In the one fatal case death could have been prevented if the urological examination had been made earlier

Although hematuria is only a sign, it occurs as the result of little understood causes so frequently in pregnancy that it has come to be regarded as a clinical entity

In cases of albuminuric toxemia the bleeding is usually bilateral and occurs in the severe pre-eclamptic type and cases of chronic nephritis with high blood pressure. In cases of pyelitis it is almost always unilateral and may occur at the beginning of an acute attack or without warning in a chronic case. In some instances the bleeding may be caused by stretching of the renal pelvis or calyces and may be stopped very quickly by the insertion of a ureteral catheter to relieve the tension. It is difficult to prevent obstruction of the catheter by a blood clot

Nephrectomy may be required eventually if the patient becomes too anemic, but although the hemorrhage is often severe it seldom lasts for more than a few days at a time. Nephrectomy is not required as an emergency measure

J THORNWELL WITHERSPOON, M D

LABOR AND ITS COMPLICATIONS

Reiles, M. Considerations on the Artificial Induction of Labor (Considerations sur le déclenchement artificiel de l'accouchement). *Rev franç de gynéc et d obst*, 1936, 31 335

Posterior pituitary extracts, now properly standardized are of inestimable value in obstetrics, especially for induction of labor and stimulation of the uterine contractions during labor. Their use is much superior to that of the older mechanical methods which are all sources of danger since they involve the introduction of foreign bodies (bougie, dilatable bag) into the lower uterine segment. Among other methods that have been advocated for the same purposes are galvanization of the cervix, hot irrigations, cervical tamponade, and electrical stimulation of the breasts. The use of oxytocic drugs, particularly posterior pituitary extracts, is so rapidly being substituted for such methods that these procedures are now chiefly of historical interest

The author briefly reviews the history of the use of pituitary extract for the induction of labor and the stimulation of uterine contractions during labor. Fries (1911) and Hager (1912) were the first to employ it for these purposes. Watson (1913) and Stein (1920) made the most valuable contributions. Stein's method (the administration of castor oil plus pituitrin in small divided doses) started a new era in the medical induction of labor. However, the results obtained by others with Stein's method, with or without modifications, have been extremely variable. Von Kreis obtained good results in only 10 per cent of his cases, whereas Eversmann obtained them in all

The author reports the results he obtained with Stein's method in eighty six cases, most of which were cases of premature rupture of the membranes. Some obstetricians believe that premature rupture of the membranes is apt to be followed by serious complications (prolongation of labor, ascending infection), whereas others believe it is of little

importance. The author is of the opinion that the truth lies somewhere between these extremes. He believes that to lessen the danger of ascending infection the period between the time of rupture and the onset of labor should be made as short as possible and that vaginal examinations and manipulations should be avoided. He does not attempt to induce labor until at least twelve hours have elapsed after rupture of the sac. The procedure in his cases is as follows:

At 5 a.m. castor oil is given and at 7 a.m. a hot bath. At 8 a.m. and every half hour thereafter 0.25 c.c. of hypophyline is administered until a total of 1 c.c. has been given. If labor begins before the total dose has been administered the injections are stopped. If labor does not begin soon after the administration of the total dose antispasmodic drugs are given and the treatment is repeated on succeeding days. Quinine is used only when pituitary extract has failed.

The results have been best in cases in which the membranes had ruptured previously. Of seventy six cases of this type labor was induced successfully in sixty four (84.21 per cent) and began spontaneously on the following day in the remaining twelve. In fifty nine cases labor began after the first attempt in four after the second attempt and in one after the third attempt. In fifty seven cases delivery occurred spontaneously in seven intervention was necessary. Of the latter the use of outlet forceps was required in two because of inertia and surgical procedures to bring about complete dilatation of the cervix were necessitated in five by soft part dystocia. Labor was induced more easily soon after rupture than when the induction was delayed forty eight hours and more easily also in multiparas than in primiparas. The average length of normal labor after induction was eight hours and forty eight minutes in the cases of primiparas and four hours in the cases of multiparas. Of the eighty five infants born after the induction of labor five were macerated and stillborn and six died a few hours or days after birth. In no case did fetal death occur during labor and in none was intervention necessary on account of fetal distress. The maternal mortality was 18.6 per cent. In the case of a multipara with prolapse of the cord and rupture of the membranes four days before her admission to the hospital rapid delivery of a macerated premature infant in transverse position occurred five hours after medical induction of labor and death of the mother from septicemia on the seventh day after delivery.

The author believes that castor oil has very little oxytocic value. Quinine is very variable in its effect as the latter depends upon the sensitivity of the patient. It is without danger to the mother even when signs of toxicity are present but large doses have been reported to be dangerous to the fetus. The total dose should not exceed 1 gm. This should be given in four doses of 0.25 gm. Success or failure of medical induction are dependent upon

many factors but above all upon the physiological condition of the uterus at the time the induction is attempted. Neither the state of the amniotic sac (ruptured or intact), the state of the cervix and lower segment of the uterus, the woman's parts, the presentation, nor the degree of engagement of the head is alone responsible for the success or failure of induction. The most successful results are obtained in cases at or near term in which uterine contractions already present to some degree can readily be increased by pituitary extract.

HAROLD C. MACK, M.D.

Hauch E. and Møller Christensen E. Preliminary Results with Ergometrine. *Acta obst et gynec Scand* 1936 16 132

After briefly reviewing the history of the use of ergometrine, the authors discuss the methods of hysterography. They then report experiments which they carried out to determine the correctness of the results obtained by Moir with the ergometrine discovered by him. A Danish ergometrine preparation was employed.

Moir's results were confirmed. Moreover, better results with regard to uterine contractions were obtained with the ergometrine doses used than with the corresponding doses of *extractum fluidum scellae cornutum*.

Jacobs F. The Physiology and the Mechanics of Labor During the Period of Dilatation (Zur Physiologie und Mechanik der Geburt während der Eröffnungsperiode). *Arch f Gynak* 1935 160 17

After reviewing the various theories regarding the dilatation of the cervix during labor, the author reports the findings of a study of the mechanics of the uterus which included the form, structure, and processes of contraction of the uterine wall.

In his opinion the teaching that during contraction of the uterine wall the organ must assume a spherical form, that the lower portions of the uterus remain passive and become stretched and that the membranes drive a 'point' forward is incorrect. After reviewing the theories of Bandl he concludes that Bandl's belief that the lower portion of the uterus is formed from the cervix cannot be supported today since it is now known that the lower uterine segment originates from the isthmus portion of the uterus, the mucous membrane of which unlike that of the cervix undergoes the same deciduous changes as the mucous membrane of the corpus. However, Bandl did not ascribe a passive rôle to the lower uterine segment but believed that it conforms to the contractions of the corpus and takes part in the activity of the organ as a whole.

The author next discusses the changes occurring in the cervical tissue, the dilatation of the uterine os and the conception of the uterus as a hollow muscle. He arrives at the following conclusions:

The uterus is a hollow muscle and its evacuation is fundamentally analogous to that of every other hollow organ. Uterine function depends upon the

physiological nature of the substance of the uterus and therefore follows the laws governing the function of smooth muscle. The mechanics of uterine action are determined by the form and the physical character of the contents of the uterus. When a solid content has reached the point at which its size remains constant, the process is terminated by "pains."

The uterine musculature tends to become progressively shortened in all its parts throughout labor. However, the mechanical factors which underlie this process and vary in their own activity differ in the different stages of labor. From the complex play of forces between the organ and its contents arise the changes and the multiplicity of the phenomena of labor. As long as the contents remain practically constant, the contraction of the musculature of the uterine wall produces in them only a change of form to which the wall of the organ adapts itself by partial stretching. In this process there occurs an accumulation of the muscular elements toward the region of the fundus, where a constant shortening occurs. Simultaneously, the musculature of the lower part of the organ become active, the cervical tissue unfolds, and the uterine os opens. If the tissue of the cervix, which follows the parts of the wall drawn up over the passive fetus, is able to bring about the formation of a "straight" continuation of the lower segment, the ascent of the uterine walls ceases and mobilization and downward movement of the uterine contents occur. After evacuation of the cavity, simple continuation of the muscle shortening results in a general contraction of the organ and termination of the process.

(WAHL) J. DANIEL WILLEMS, M.D.

Møller Christensen, E., and Pedersen Bjergaard, K. Investigations Regarding the Estrin Content of the Blood and Urine of Women in Labor (Untersuchungen ueber die Oestinnmenge in Blut und Harn bei Gebuerenden) *Acta obst et gynec Scand*, 1936, 16: 142.

The authors determined the estrin content of the urine of seventy five women in labor. In the cases of twenty two of these they determined also the estrin content of the blood. Seventeen of the women had primary weakness of uterine action. The fifty eight others had normal labors. From the findings of these investigations the following conclusions are drawn:

1. The amount of estrin in the urine of women in labor may vary from 1,000 to 100,000 m. u. per liter.
2. The relation between the estrin content of the blood and that of the urine varies from 1/3 to 1/75.
3. The theory that the production of estrin is low in women with primary weakness of uterine action was not supported by the findings. On the contrary, the results indicated that there is no difference in the production of estrin during labor by women with normal labor and those with primary weakness of uterine action.

Rauramo, M. Dilatation of the Rectum, Sigmoid, and Colon as a Cause of Dystocia (Megarectum sigma colon comme dystocie maternelle) *Acta obst et gynec Scand*, 1936, 16: 160.

The author reports a case in which labor was obstructed by dilatation of the rectum, sigmoid, and colon due to atresia of a vaginal anus. Porro's operation was done and the intestine then emptied manually through the anal aperture in the posterior wall of the vagina, which was widened surgically.

Winter, E. The Mortality and Morbidity Following Manual Separation of the Placenta in the State Obstetrical Institute, School of Midwifery, and the Gynecological Clinic of Bamberg (Mortalitaet und Morbiditaet nach manueller Placentalaesung in der Staatlichen Entbindungsanstalt, Hebammenschule und Frauenklinik Bamberg) 1935 Erlangen, Dissertation.

In the first part of this article the author reviews the literature on manual separation of the placenta. In the second part he reports the results of this procedure at the State Obstetrical Institute connected with the Gynecological Clinic of Bamberg during the years from 1920 to 1933.

The indications in the reviewed cases were retention of the placenta with severe hemorrhage and retention of the placenta without hemorrhage when, after two hours, all other methods of separation had been unsuccessful.

It is noteworthy that Bagestou's method of inducing placental turbulence was tried in only one case, and without success. When hemorrhage occurred the procedure depended upon the amount of blood lost. If 400 gm. of blood were lost, so called external manipulation was done, if 600 gm. were lost, Crede's method was used, and if 800 gm. were lost, the Crede procedure was carried out under anesthesia and followed immediately by manual separation.

These systematic methods were abandoned whenever the hemorrhage became so alarming that emergency treatment was indicated. Compression of the aorta preceding the manual separation was never employed.

The technique of disinfection was the usual technique. In urgent cases not allowing time for disinfection, rubber gloves were used after application of iodine to the hands. Additional gloves were not employed. Vaginal douches were not given.

Of 6,105 deliveries in the five-year period from 1929 to 1933, manual separation of the placenta was necessary in 275 (4.5 per cent). One hundred and thirty (2.1 per cent) of the manual separations were uncomplicated and 145 (2.37 per cent) followed surgical interventions.

A single rise in the temperature to the fever point occurred in 12.7 per cent of the cases, a moderate fever lasting several days in 13.5 per cent, and sepsis in 1 case (0.36 per cent). There were 2 deaths, a mortality of 0.72 per cent. In both of the fatal cases the separation of the placenta was done after opera-

tive delivery. In the first case the manual separation was followed by hemorrhage which nothing, not even tampons could stop. Death occurred two hours after the operation. It was attributed to anemia. In the second fatal case there was a partial placenta previa with great loss of blood before the woman entered the clinic. The placenta was separated manually after metrorrhysis followed by version and extraction of the child. Although the loss of blood caused by the separation was slight the patient died soon after the operation because of the total loss of blood.

The patient with sepsis recovered and was discharged twenty three days after delivery. As the midwife had made several examinations before this patient's admission to the clinic the clinic was not responsible for the sepsis.

Both of the deaths were due to atony, not to the manual separation of the placenta. Therefore, the results of the manual separations as a whole were very favorable.

(G SCHAEFER) MATTHIAS J SEIFERT M D

NEWBORN

Bernhart, F. The Mortality of the Newborn (Ueber Neugeborenenfruehsterblichkeit). *Zentralbl f Gynaek* 1936 p 2717.

The author reviews the deaths of infants occurring at the Gynecological Clinic of Vienna in the period from 1924 to 1934. Of 22,825 infants weighing more than 1,500 gm at birth 1,006 (4.35 per cent) were born dead or died within ten days after birth.

Five hundred and sixteen (2.24 per cent) were born dead. Of these, 170 (0.7 per cent) were macerated. In only 44 of the cases of fetal maceration was there syphilis of the mother and child. If the deaths of 8 infants who died of syphilis later are included the infant mortality from that disease was 0.23 per cent. This demonstrates that syphilis has become a much less frequent cause of death of newborn infants than it was formerly.

Four hundred and ninety (2.11 per cent) of the infants died within the first ten days after birth. Many more newborn infants succumb to birth trauma immediately than survive such trauma and die later of other causes. The longer a child lives the more difficult it becomes to explain its death on the basis of birth trauma.

Of the total number of 1,006 infants born dead or dying soon after birth, 588 weighed up to 2,800 gm and 418 weighed more than 2,800 gm. The author emphasizes the possibility of reducing the mortality of the newborn by decreasing the incidence of premature birth, some of the causes of which—such as chronic general diseases and constitutional insufficiency of the mother—can be prevented.

Among the infants whose cases are reviewed there were 135 males to every 100 females.

A large number of deaths due to birth trauma are to be ascribed to pathological positions of the fetus in the uterus. Most important of the latter are breech and transverse presentations. In cases of breech presentation operative procedures have a higher mortality (16 per cent) than forceps procedures (10 per cent). Of the cases reviewed cesarean section was performed in 358 with death of the infant in 25 (1.3 per cent). Only 5 of the deaths were not directly attributable to the operation. These were due to asphyxia.

Surprisingly large was the number of infants born of multiparas which died soon after birth. Of these, 67.8 per cent were born prematurely.

Multiple births also have an influence on the infant mortality. It is noteworthy that the second born of twins is more apt to die than the first born.

Theories regarding the causes of death of the newborn have changed considerably in the course of time. Whereas asphyxia was formerly regarded as the immediate cause of death it is now believed that a respiratory disturbance is the primary cause and that asphyxia is secondary. There are also a large number of infants who are secondarily weak and although fully developed, are injured at birth to such an extent that they are unable to meet the demands of extra uterine life. In contrast to these the author regards prematurely born infants as primarily weak.

In conclusion Bernhart summarizes the causes of the deaths of 197 of the stillborn infants and 250 of the infants dying soon after birth. These were as follows:

Stillborn infants: cerebral hemorrhage, 98, asphyxia, 73, deformities 20, trauma, 6.

Infants dying within ten days after birth: cerebral hemorrhage, 108, asphyxia, 69, pneumonia, 68, deformities 52, debility 41, miscellaneous causes 22.

(G SCHAEFER) J DANIEL WILLEMS M D

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Labbok, A. Anatomical Studies of the Nerves of the Horseshoe Kidney (Anatomische Untersuchungen der Nerven der Hufseisenniere) *Ztschr f urol Chir*, 1936, 41 385

From careful studies of two specimens of horseshoe kidney, which he describes in detail, the author draws the following conclusions

Because of the paucity of the literature, the investigation of the peculiarities of the innervation of the horseshoe kidney cannot be regarded as having been completed. The course of the individual nerve branches from the abdominal plexus to the renal plexus may vary greatly because of a congenital dystopia, of which horseshoe kidney is a special type, or because of peculiarities in the origin of the renal arteries from the aorta. When there is a marked congenital dystopia of the kidneys and when the renal arteries depart from the aorta at a low level, the site of origin of the nerve fibers is displaced to a lower plexus and the course of the nerves corresponds to the peculiarities of the position of the kidneys and the site of origin of the renal arteries from the aorta.

In the development of painful sensations in cases of horseshoe kidney the anastomoses between the inferior mesenteric plexus and the hypogastric plexus play an important role. The anastomoses between the inferior mesenteric plexus and the lumbar sympathetic trunk which were described by Ssokolow are quite definite anatomical structures. They have been studied by the author in detail and have been designated by the term "splanchnic lumbar nerves." Besides the anterior anastomoses between the inferior mesenteric plexus and the hypogastric plexus there are posterior anastomoses which, coursing behind the renal isthmus, enter the hypogastric plexus and, with the anterior anastomoses, form a sling around the isthmus.

(COLMERS) WILLIAM C BECK, M D

Papin, E., and De Berne Lagarde, R. The Indications and Technique of Total and Subtotal Nephro-Ureterectomy (Indications et technique de la néphro-urétérectomie totale et subtotale) *Arch mal d reins et d organes genito urinaires*, 1936, 10 1

In the great majority of nephrectomies the ureter is resected just below the kidney. If the lesion extends along the ureter, resection at a lower level may be necessary.

After a detailed review of the anatomical relations of the ureter in the male and female, the authors describe the following operative procedures (1) subtotal nephro ureterectomy, in which the ureter is

resected to a point above the ductus deferens in the male and above the uterine artery in the female, (2) juxta-vesical nephro ureterectomy, in which the ureter is resected near the margin of the bladder, (3) total nephro ureterectomy, in which the ureter is removed in its intramural portion down to the ureteral orifice, and (4) nephro ureterocystectomy, in which a more or less extensive portion of the urinary bladder is resected with removal of the kidney and ureter.

In the authors' opinion the ureter should be approached extraperitoneally but not transperitoneally. Of the large number of incisions proposed for the extraperitoneal approach, the suprapubic median incisions are best. The suprapubic median incisions used most often are the transverse incision of Pfannenstiel and the vertical incision.

The inferior segment of the ureter is identified and exposed by (1) lateral detachment of the bladder, (2) total detachment of the bladder, (3) extra-peritonization of the bladder, or (4) cystostomy.

Extraperitonization of the bladder is performed as follows

The space of Retzius is opened, the umbilico-precaval aponeurosis is incised transversely, and the vesical space is exposed. The bladder is then detached above and below as far as possible on both sides. If the detachment becomes difficult, the peritoneum is incised near the margin of the bladder at the level of the urachus. The peritoneal cavity is closed with catgut.

RICHARD E. SOMMA, M D

Motta, G. A Clinical Contribution to Roentgen Irradiation of the Kidney in the Treatment of Ureteral Fistulas (Contributo clinico alla irradiazione roentgen del rene nel trattamento delle fistole ureterali) *Arch di ostet e ginec*, 1936, 43 91

Motta reports three cases of ureteral fistula in which permanent cure of the fistula was obtained by roentgen irradiation of the kidney in from ten to twenty days after termination of the treatment. One of the fistulas followed an operation for tuberculous salpingitis, and one, an operation for pyosalpinx. The third was an intestinovaginal fistula due to a vaginal operation.

After critically analyzing fifty four reported cases of ureteral fistula which were treated by roentgen irradiation of the kidney with cure in 45.5 per cent, Motta discusses the unsolved problem of the changes in the renal epithelium following the irradiation, the disparity of the experimental results, and the hypotheses (all of them far from proved) which have been advanced to explain the cure of ureteral fistulas by such treatment. Unfortunately, in most of the cases reported by others, as well as in his own, cystoscopic control following the treatment was lacking.

In Motta's opinion, the changes in the renal epithelium after irradiation of the normal kidney are too slight to warrant the conclusion that the healing is due to exclusion of the kidney and the time between the roentgen treatment and the cure shows that not all cures can be explained by coincidence. The two most important factors in the cure are an immediate improvement in the composition and a transitory diminution in the amount of the urine following the irradiation. If the break in continuity is only partial and the lumen is still patent these influences favor spontaneous healing with restoration of the lumen and continuance of renal function. Under other conditions they favor it by obliteration of the ureter with secondary atrophy of the kidney.

Motta concludes that before nephrectomy is considered in cases of ureteral fistula irradiation should be given a thorough trial. M. E. MORSE, M.D.

Ostronski T. and Dobrzaniecki W. The Value of Ureteral Transplantation by Coffey's Method as Shown by Intravenous Urography (Considérations sur la valeur de l'implantation des uretères selon la méthode de K. C. Coffey à la lumière de l'urographie intra veineuse) *J de chir* 1936 47 897

The authors report six cases in which transplantation of the ureters into the colon was done by Coffey's method. In four cases it was done because of an obstetrical vesicovaginal fistula, in one case because of a postoperative fistula, and in one case because of ectrophy of the bladder in a man.

In every case a careful pre operative examination was made. This included intravenous urography to rule out abnormalities of the ureter and renal atrophy which would render the operation useless.

There were two deaths. One occurred after the implantation of one ureter as the result of the development of a large retroperitoneal hematoma and the other at the time of the implantation of the second ureter as the result of acute uremia.

During the first days after the operation all of the patients showed evidences of urinary stasis in the renal pelvis—pain in the lumbar region, dryness of the mouth, nausea and sometimes vomiting and a rise in the temperature. At the same time the blood urea increased. After this first stage, these symptoms disappeared and the blood urea diminished to about 50 mgm per 100 c.c.m. The fecal evacuations were of the type of a false diarrhea, occurring from two to four times a day. There were also from four to eight evacuations of urine daily.

Repeated studies of the surviving patients by intravenous urography showed that the excretory function of the kidney was definitely diminished. On the basis of the urographic findings and of the autopsy findings in the fatal cases the authors attribute this functional insufficiency of the kidney more to the increase of pressure in the ureters and pelvis than to infection.

Because of the diminution of renal function, the interference with normal ureteral peristalsis, the

false diarrhea (which was attributed to absorption of the urinary ammoniac salts by the colon) the authors are of the opinion that ureteral transplantation should be done in cases of vesicovaginal fistula and ectrophy of the bladder only when all other methods fail.

ALICE M. MEYERS

BLADDER, URETHRA, AND PENIS

Kasztirner J. Syphilis of the Bladder (Die Lues der Blase) *Ztschr f urol Chir* 1936 41 477

Syphilis of the bladder is extremely rare. Since 1900, only 106 cases have been reported in the literature. Some of them were diagnosed by cystoscopy and some by the Wassermann test. The symptoms may be similar to those of a very severe cystitis. Blood may appear in the urine sometimes in the form of a terminal hematuria. Frequently hematuria may be the only sign of the condition. As a rule it is due to gumma of the bladder. Hematuria occurred in half of the author's cases and a definite terminal hemorrhage in 2. In most cases of early or late syphilis of the bladder characteristic evidence of syphilis is found in the skin glands and the throat. Often cystoscopy is impossible because of hemorrhage and reduction of the size of the bladder. The size may be increased most easily by specific anti-syphilis treatment.

The cystoscopic picture of early syphilis of the bladder usually shows areas of spotty redness, erythematous syphilides, papules and ulcers. The manifestations of late syphilis of the bladder, which are more varied, are described in detail. According to the description of Miles, the syphilitic ulcer is very sharply defined as though it were cut by a knife and its base is lardaceous. Syphilis may be suspected if no tubercle bacilli or other organisms can be found in the urine and the usual treatment for catarrh of the bladder is unsuccessful. If the lesions heal under treatment with iodine, salvarsan and mercury, the diagnosis was correct. The average time required for cure varies from twelve days to two months. In neglected cases it may range from four to five months.

In conclusion the author briefly reviews the histories of 10 cases. (COLMERS) LEO A. JUVET, M.D.

Codard H. Urethroplasty for Congenital Strictures. Method of Temporary Grafting of the Penis on the Scrotum (Uréthroplastie pour rétrécissements congénitaux. Procédé de la greffe temporaire de la verge sur le scrotum) *Revue de chir*, Paris 1936 53 37

Codard states that urethroplasty following the resection of urethral strictures is a rather exceptional operation. Congenital urethral strictures have a peculiar course. Appearing early in life they cause difficulties of micturition in a period of a few years. Later under the influence of secondary factors they may become unexpectedly worse.

The author reports the case of a man forty five years old whose difficulties of micturition began at

puherty with frequency and burning on urination. A diagnosis of deep, congenital urethral stricture was made. In spite of several dilatations and urethrotomies, acute urinary retention ultimately developed. After performing a cystostomy Godard attempted resection of the stricture followed by urethroplasty.

The technique employed in this case was the same as that used in the surgical treatment of certain types of hypospadias, consisting of reconstruction of the lower segment of the urethra at the expense of the skin of the scrotum. In the first stage of the operation the penis was grafted into the skin of the scrotum and sutured to it. In the second stage the penis was lifted up from the graft, together with two lateral scrotal flaps, and the flaps were sutured to the under surface of the median line. Care was taken to insure perfect vascularization of the pedicle. The patient made an uneventful recovery.

Gross examination of the resected urethra revealed the presence of two strictures, one about 2 cm. from the meatus and the other, 1 cm. long, about 6 cm. from the external orifice. Microscopic examination showed complete preservation of the mucosa and, around the lumen, a large sclerotic plaque of hard consistency which apparently had replaced the spongy portion of the urethra. The lesion was distinctly periurethral and subepithelial.

The author calls attention to the possibility of the formation of phosphatic calculi due to the presence of hair on the scrotal flaps. Although this complication did not occur in his case, it has been reported repeatedly in the literature. Godard made the observation that the skin of the scrotum, in a zone 3 mm. to either side of the median raphe, has only a very small number of hair follicles. To eliminate the danger of phosphatic calculus, he recommends careful pre-operative depilation of the scrotum by x-ray irradiation, chemical means or, preferably, electrocoagulation. He states that the resulting scars are small and the elasticity of the scrotal flap is not impaired.

RICHARD E. SOMMA, M.D.

GENITAL ORGANS

Millin, T. Impotence and Its Surgical Treatment With Reference to a New Operative Procedure. *Proc Roy Soc Med*, Lond., 1936, 29: 817.

The author limits his discussion of impotence to the cases in which erection is absent or so feeble that coitus is impossible. Such cases may be classified into the following three groups: (1) those in which the impotence followed trauma to the perineum, either operative or accidental, (2) those in which it followed inflammatory lesions of the perineum resulting in extensive scar formation, and (3) those in which no organic or psychological cause for the condition is apparent.

The new operative procedure discussed by Millin is the operation devised by Lowsley on the basis of the theory that contraction of the bulbocavernosus

and ischioavernosus muscles is largely responsible for erection. Of fourteen cases in which Lowsley performed his operation, completely successful results were obtained in nine. In all of the cases erection had been impossible or unsatisfactory for at least two years. Millin reports on eight cases in which he performed the operation. Three of his patients were rendered impotent by trauma, two had never succeeded in having intercourse, and the remaining three had become impotent after a period of active sexual life. Millin emphasizes that in the selection of the cases for the operation it is essential to exclude those due to neuropathies or endocrine disturbances, those of transient impotence, and those of disorders such as premature ejaculation. Whether the operation supplements the erectogenic processes by increasing the venous congestion is not known. However, when the reflex arcs are intact it may be successful. The duration of the effects of such muscle reefing has not yet been determined.

In conclusion Millin says that a considerable number of cases of impotence call for medical or psychiatric therapy. When urethral abnormalities are present, endoscopic methods are indicated. In cases of impotence with a history of perineal trauma or inflammatory lesions, Lowsley's operation holds out remarkable prospects. It may be successful also in the cases of patients in the fourth or fifth decade of life who, after normal sexual life have developed total or partial impotence not responding to conservative urological or psychiatric therapy. For older patients with failing potency, Millin recommends the Lowsley operation combined with a Steinach procedure. ELMER HESS, M.D.

Elliott-Smith, A. The Steinach II Operation for Prostatic Obstruction. *Proc Roy Soc Med*, Lond., 1936, 29: 825.

The Steinach II operation was not originally intended for the treatment of prostatic hypertrophy, but was devised to overcome certain disadvantages of simple ligation of the vas deferens. It was apparently first used for prostatic obstruction by Niehans.

The operation is performed under local anesthesia. The cord is exposed by an incision made over each external inguinal ring. After opening of the tunica vaginalis and delivery of the testicle a silk ligature passed through the digital fossa and tied so that it will occupy the groove between the globus major and the body of the testicle.

Patients on catheter treatment for urinary retention will often recover the power of normal micturition, but if a patient with complete retention develops an acute epididymitis, return to normal micturition in the ensuing three or four days becomes almost a certainty.

During the last eighteen months the author has performed the Steinach II operation twenty times. The pre-operative treatment consisted of bladder lavage, the administration of hexamine and acid

sodium phosphate by mouth, and the forcing of fluids. Blood urea determinations and urea concentration tests were made.

If the patient passed urine freely after the operation, catheterization was delayed for twenty-four hours but if the amount of urine passed was small catheterization was done after twelve hours or as soon as the patient complained of discomfort. The frequency of catheterization depended upon the daily residual urine. Urinary infection was treated by the use of an indwelling catheter and lavage. If the measures were not followed by rapid improvement, suprapubic cystostomy was performed without delay.

Three of the patients died and seventeen left the hospital with fairly good control of micturition. In no case was the residual urine over 4 oz. at the time of discharge. Of the seventeen patients discharged from the hospital, two cannot be traced and two returned with recurrence of the prostatic obstruction for which prostatectomy was done. The remaining thirteen are still under observation after from one to eighteen months. One of them has about 10 oz. of residual urine. In the cases of the others micturition occurs without any difficulty and with diminished frequency and the residual urine varies from 3½ to 3 oz.

The author believes that many patients with prostatic obstruction who are now subjected to prostatectomy could be relieved by the simple Steinach II operation. ELMER HESS M.D.

Chauvin and Mosinger: Malpighian Epitheliomas of the Prostate and Their Histogenesis (*Sur les épithéliomas malpighiens de la prostate et leur histogénèse*). *J. d'uról méd et chir.* 1936 41 297

Malpighian epitheliomas are found not only in the skin and in mucosa lined with stratified pavement epithelium, but also in certain viscera which under normal conditions are lined with a cylindrical or acinglandular epithelium. They occur very frequently in the lungs, uterus, biliary tract, nasal cavity, fallopian tubes, pancreas and salivary glands. In the genito-urinary tract 2 groups of malpighian tumors have been distinguished: (1) those involving the paramalpighian mucosa of the excretory urinary tract, and (2) metaplastic malpighian epitheliomas involving organs without a paramalpighian structure. The latter include the malpighian epitheliomas of the prostate.

With regard to the histogenesis of malpighian tumors 3 hypotheses have been advanced. According to the first the tumor develops from an islet of malpighian metaplasia such as may occur in the biliary tract, respiratory tract or the body of the uterus following a chronic inflammatory process. According to the second theory malpighian tumors of viscera of non malpighian structure develop on a dysembryonic basis. According to the third theory, the tumors occur as a direct transformation of normal epithelium into cancerous tissue of malpighian structure.

On the basis of a study of 117 inflammatory or neoplastic prostates the authors attempted to answer the following questions:

1. Do the histological findings support any of these theories?

2. What is the incidence of malpighian or paramalpighian islets in non neoplastic prostates?

3. What is their incidence in adenomas of the prostate?

4. Are malpighian islets found predominantly in prostatic epitheliomas of glandular structure?

The report in detail a case in which histological examination revealed: (1) a prostatic adenoma in which the hyperplastic process was combined with malpighian metaplastic phenomena, and (2) a malpighian epithelioma engrafted on the adenomyoma. The patient was a man eighty years old. This case definitely supports the theory of a direct tumoral metaplasia. However, the process developed on predisposed tissue as shown by the metaplastic islets disseminated in the adenomatous areas.

In non neoplastic prostates malpighian islets occur in chronic prostatitis, simple or suppurative. Moreover there is a physiological malpighian stage of the prostate between the eighth and ninth month of intra uterine life. Thus malpighian epithelium disappears about the second month after birth.

Of 115 cases of benign adenoma of the prostate the authors found malpighian metaplasia analogous to that observed in the adenomatous portion in the case reported in 38 (33 per cent). As a rule the change involves only 1 or 2 acini, nearly always in contact with a leucocyte polynuclear or lymphocyte islet. Occasionally the metaplasia may be demonstrated in several zones, in which case it does not appear related to a mesenchymatous inflammatory process. The pathogenic mechanism of the phenomena under these conditions is as obscure as that of the hypertrophic adenoma itself. In 6 prostatic epitheliomas of various structure, malpighian islets were discovered 3 times in the midst of the tumor tissue.

The authors conclude that malpighian metaplasia occurs in 32 per cent of prostatic adenomas as well as in prostatitis. The possibility of the secondary development of malpighian cancer from these islets must be taken into consideration. The findings in the author's case of malpighian cancer and the frequency of malpighian islets in prostatic cancer of different structure indicates that the malpighian aspect may appear simultaneously with cancerization.

EDITH SCHANCHE MOORE

Blanc H: The Cystic Form of Cancer of the Prostate (*La forme kystique du cancer de la prostate*). *J. d'uról méd et chir.* 1936 41 13

Blanc reviews six cases of the cystic form of cancer of the prostate which have been recorded in the literature and reports one case which came under his own observation.

The usual symptoms of the condition are those of ordinary prostatic hypertrophy, namely, dysuria,

nocturia, retention, and hematuria. Pain is for a long time absent. When the prostatic mass projects into the rectum there may be some disturbance of defecation.

Rectal examination reveals a smooth, fluctuant swelling. There is none of the nodularity and woody hardness found in the usual carcinoma of the prostate. The swelling is always clearly limited to one or the other lobe and does not involve the median interlohar groove. In short, there is nothing in either the symptoms or the findings of physical examination to suggest malignancy.

Whether or not the nature of the condition is recognized, surgical evacuation of the cyst is usually necessary. The cyst contents are hemorrhagic or serous. They may be clear or contain debris of the tumor. The inner surface of the cyst may be entirely smooth. Following relief of the urinary obstruction it is only after the elapse of weeks or months that the essentially malignant character of the growth becomes apparent.

In some cases the cysts seem to be the result of a liquefaction necrosis of the cancer, and in others, of an interstitial hemorrhage. There are reasons for believing also that the cysts and the cancer may arise as independent processes.

The treatment is only palliative and is directed toward relief of the urinary retention.

ALBERT F. DE GROIT, M.D.

Grasso, R. Torsion of the Sessile Hydatid of Morgagni (Sulla torsione dell'idatide sessile di Morgagni). *Arch. ital. di chir.*, 1936, 43, 221.

The case reported was that of an eleven year old boy with an essentially negative past history. The child was brought to the clinic because of a moderately severe pain which developed suddenly in the right testicle a few days previously while he was walking and was followed by an increase in the size of the right half of the scrotum and a slight elevation of the temperature. Aspiration of the right half of the scrotum yielded 5 c. cm. of a limpid, sero sanguinous sterile substance. A diagnosis of torsion of the right spermatic cord was made.

Under ether anesthesia the testicle was exposed by an anterior scrotal incision. On its superior pole there was found a bluish black body about the size of a large pea, which resembled a blood clot and was attached to the testicle by a slender stalk. Removal of this body was followed by uneventful recovery.

On gross examination, the removed tissue presented the picture typical of a hemorrhagic infarct. On microscopic examination its structure was found greatly altered by the presence of an interstitial hemorrhage. The hemorrhagic infarcts were surrounded by aggregations of polymorphous cells. The blood vessels appeared engorged and dilated. Normally, the hydatid of Morgagni shows a stroma of connective tissue rich in fibroblasts and containing large blood and lymph vessels.

The anatomical diagnosis in the reported case was torsion of the hydatid of Morgagni.

Grasso subdivides embryonal rests of the testicle anatomically into (1) the sessile hydatid of Morgagni or testicular hydatid, (2) the pedunculated hydatid of Morgagni or hydatid of the epididymis, (3) the paradidymis or organ of Giraldes, and (4) the vasa aberrantia or aberrant ducts of the epididymis.

After reviewing the literature on the sessile hydatid of Morgagni the author discusses the normal and pathological features of this rest and the symptoms produced when it undergoes torsion. The first symptom of torsion is usually spontaneous pain not explainable by any other condition. The pain may be tolerable or so severe that it disables the patient. It is localized in the testicle and the corresponding inguinal region. Physical examination of the scrotum reveals swelling, redness, and tenderness to pressure. Fever is usually absent.

Grasso states that in all cases of acute or subacute orchitis occurring at the age of puberty the possibility of an infectious orchitis epididymitis and of torsion of the spermatic cord or embryonal appendages must be considered. The presence of hemorrhagic fluid in the material evacuated by aspiration is a strong indication of torsion of these structures.

The treatment indicated for torsion of the sessile hydatid of Morgagni is prompt operation. In all cases the prognosis offered by such treatment is excellent.

RICHARD E. SOMMA, M.D.

Abell, I. Cysts of the Testicle. *Ann. Surg.*, 1936, 103, 941.

Cysts of the testicle, exclusive of hydroceles of the tunica vaginalis, encysted hydroceles of the cord, and hydroceles occasionally occurring in the body of the testicle, arise within epididymal structures or vestigial remnants connected with them. The author has seen thirty two cases of cysts with such an origin and site. Only one of the subjects gave a history of gonorrhea. In four cases there was a history of trauma. Twenty six operations were performed on twenty five patients. In four cases there was polycystic disease. In two of these the condition was bilateral.

From the standpoint of etiology, cysts of the testicle fall into three groups: (1) cysts having their origin in vestigial remnants, (2) retention cysts, and (3) polycystic disease or cystic embryomas.

Retention cysts develop most frequently in the vasa efferentia and least frequently in the congenital granulosa of the glochus major.

Polycystic disease of the epididymis may consist of retention cysts due to obstruction or may present the characteristics of a true neoplasm. In the latter type the agglomerated cysts replace or destroy the epididymal tubules and at times attain a huge size. On the basis of their anatomicopathological make up they are to be classified as cystic embryomas.

ELMER HESS, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES TENDONS, ETC

Huggins C B McCarroll H R and Blockson B H Jr Experiments on the Theory of Osteogenesis The Influence of Local Calcium Deposits on Ossification the Osteogenic Stimulus of Epithelium *Arch Surg* 1936 32 915

The inorganic constitution of bone is influenced by the composition of the body fluids. Under normal conditions the predominant salts are of the apatite group but under abnormal conditions other salts accumulate and any chemical combination which tends to make an insoluble or difficultly soluble salt in a faintly alkaline watery medium will be found in the teeth and bone.

The authors carried out experiments to determine whether a local deposit of calcium stimulates osteogenesis and to discover the nature of the epithelial osteogenic stimulus.

In the first experiment carried out on dogs bone salts were implanted in the abdominal wall a surgical defect in a rib and a trephine defect in the skull. No new bone was formed.

In the second experiment also carried out on dogs teeth were implanted in the abdominal wall. After the implantation of normal deciduous teeth fibrous connective tissue was found filling the pulp space of the teeth and new bone formation occurred. After the implantation of boiled deciduous teeth, no new bone formation was found. It therefore appeared that the new bone formation following the implantation of normal deciduous teeth was due to transplanted tooth cells rather than to the solid calcified phase. After the implantation of unboiled unerupted teeth bone was found in the pulp space of seven out of ten teeth.

In the third experiment epithelium of the urinary bladder was transplanted to the abdominal fascia of rats and guinea pigs. Bone formation resulted.

In the fourth experiment carried out on dogs epithelium of the urinary bladder was transplanted into or to the surface of the spleen. When it was transplanted into the spleen it led to the formation of bone only if connective tissue capable of ossification was transplanted with it. Transplantation of such epithelium to the surface of the spleen led to the formation of a small amount of bone in several instances.

In the fifth experiment, the mucosa of the urinary bladder was transplanted to the peritoneum of nine dogs. In every instance bone was found. This finding led to the conclusion that the subperiosteal fibroblasts in the outer coat of the bladder differ from the fibroblasts adjacent to the lining epithelium of this structure in that the former ossify when in

contact with bladder epithelium while the latter do not.

RUDOLPH S REICH M D

Colombo C and Romero A Clinical and Experimental Researches on Chronaxia in Muscular Atrophy Following Trauma and Infections of Joints (Ricerche cronassimetriche cliniche e sperimentali nelle amiotrofie consecutive a traumatismi e infezioni articolari) *Arch Ital di chir*, 1936 43 123

The authors studies were carried out on twenty three patients with muscular atrophy following trauma or infection of different joints and on rabbits having a similar atrophy consecutive to an aseptic arthritis of the knee produced by scraping of the cartilage. The purpose of the researches was to study the pathogenesis of the atrophy and the changes in chronaxia occurring with the evolution of the lesion and to determine whether chronaximetric examination is of practical clinical value.

The findings were the same in both the human and the animal subjects. The atrophic muscles constantly showed increased chronaxia as long as the joint lesion was clinically active. When the joint conditions were stationary the chronaxia was normal. There was no parallelism between the degree of atrophy and the changes in muscle chronaxia, and reduction of the atrophy through exercise was not accompanied by diminution of chronaxia. With increased chronaxia the muscle rebound was usually raised, but sometimes it was normal. In several instances of normal chronaxia it was raised. The reaction of degeneration longitudinal hyperexcitability, and slowed contraction were never present. The nerve chronaxia of the atrophic muscles remained normal.

The earliest and most intense atrophies occurred after trauma to the knee and the next earliest and most intense atrophies after trauma to the shoulder. In the animal experiments atrophy of the quadriceps was apparent within two or three days and reached remarkable proportions. The muscle chronaxia increased with the atrophy, becoming from three to seven times that of the normal side. There was no parallelism in the further course of the two phenomena as the atrophy persisted while the chronaxia returned to normal in from three to thirteen days.

On the basis of the literature and their own observations the authors conclude that muscular atrophy following joint lesions is of a reflex nature and that the arc arises in the sensory neurone from the joint and reaches the muscle by way of the sympathetic system thus altering the trophism of the muscle and perhaps also determining the hyperreflexivity. These atrophies belong in the same

group as Bourguignon's lesions of repercussion and are related also to "physiopathic" disturbances of Babinski and Froment

The findings reviewed are of clinical importance as they prove that increased muscular chronaxia indicates, independently of the presence of muscular atrophy, the presence of an active joint lesion

The data are presented in tabular form, and the article has a bibliography M E MORSE, M D

Bergstrand, H Four Cases of Ewing Sarcoma in Ribs *Am J Cancer*, 1936, 27 26

The author reports four cases of Ewing sarcoma in ribs All were much alike The patients had just reached the age of puberty The tumors were localized in the sixth to eighth ribs and were all at the back They grew into the pleural cavity like a sponge, pushing the pleura away The tumor tissue had lifted the periosteum on the pleural surface of the ribs as far as the attachment of the intercostal muscles As a consequence, the inside of the rib was rough, with periosteal spicules, while the outside was smooth, although tumor tissue had infiltrated all around the bone The tumor tissue had also filled the haversian canals throughout the thickness of the rib

The localization of the tumors to the posterior parts of the sixth to eighth ribs is noteworthy, these being the sites of earliest ossification The time when ossification begins in the bones in which Ewing sarcoma occurs was therefore investigated

A study of the cases reported by Geschickter and Copeland and by Connor showed that in practically all instances the tumors occur in the parts of the skeleton where ossification begins toward the end of the second month of fetal life (Keibel and Mall) This is in agreement with the previously made observation that this form of malignant growth occurs primarily in the shafts of the long bones and never in the epiphyses Geschickter has reported nineteen cases in which the tumor occurred in the maxilla, which are formed at the same early stage but are not preformed in cartilage

Only a few cases are not in accord with this rule, and of these, several are doubtful

Conclusions regarding the histogenesis of Ewing sarcoma might be permissible on the basis of the peculiar localization of the tumor Ewing considered the neoplasm an endothelioma arising in the endothelium of the lymphatics in the haversian canals Connor suggested that it arises from the reticuloendothelial system This opinion is shared by Oberling, who therefore includes the Ewing sarcoma in his system of reticuloendothelial tumors Geschickter and Copeland believe that the growth originates in the intracortical or subperiosteal lymphoid tissue Melnik maintains that it is a round cell sarcoma arising in the undifferentiated embryonal connective tissue cells in the haversian canals

The author concludes that the Ewing sarcoma may possibly be traced back to a disturbance in

the formation of the skeleton at a very early stage of fetal life This is known to be characterized by a condensation of the mesenchymal blastema the cells of which ultimately form the precartilaginous These early cells are very similar to the tumor cells of the Ewing sarcoma The marked sensitivity of Ewing sarcomas to irradiation would be explained if the cells are comparable to such primitive embryonal cells NORMAN C BULLOCK, M D

Owre, A Chondromalacia Patellae *Acta chirurg Scand*, 1936, 77 Supp 41

The term "chondromalacia patellae" is used by the author to designate a disease of the patella in which the cartilage is softened, degenerated, and fissured

In 1,002 autopsies, Heine found that lesions due to arthritis were most frequent in the patella and next most frequent in the lateral condyle of the tibia In subjects under twenty years of age they were rare

The author made 124 autopsy examinations of the patellae of supposedly normal knees The most common abnormalities found were edema of the cartilage, longitudinal streaking due to degeneration changes, tuft formation on the synovial flap, and thickening of the synovial membrane The patellar cartilage is the thickest articular cartilage in the body In the subjects under twenty years old it was found to be from 3.8 to 4.9 mm thick, in those of middle age, somewhat thicker, and in those who were old, much thinner, sometimes only 1 or 2 mm thick Fissure formation and fraying of the cartilage were not seen in the subjects under twenty years old, but were noted often in those from twenty to twenty-nine years old and were prominent features in those from thirty to thirty-nine years old In several cases small disk shaped pieces of cartilage were attached by delicate stalks to the rest of the cartilage A connective tissue band was often found on the medial edge of the patella In the subjects from forty to fifty-nine years old edema was overshadowed by other lesions of the cartilage, such as longitudinal streaks, fissures, fraying, and tuft formation In some of the subjects over sixty years old the cartilage was reduced to a thin yellowish gray covering over the bone These degenerative changes were always first noted on the medial facet of the patella As the degenerative processes increase, the flakes and tufts of cartilage disappear In the most pronounced cases the bone is practically denuded of cartilage

The patellar cartilage has no power of regeneration Fissures and other defects are filled in by connective tissue or bone In later stages of degeneration the adjacent underlying bone becomes somewhat resorbed and the marrow spaces are replaced by fibrous tissue formation

The author presents in tabular form the findings of a study of 74 cases, involving the examination of 3,000 slides In the age group under twenty years there were 6 patients with definite evidence of degenerative changes in the cartilage In some cases these changes were noted in the cartilage before full

development of the patella. The lesions were found on the mesial facet more frequently than on the lateral facet. In 8 out of 10 cases changes similar to those in the patella were found in the cartilage of the lateral tibial condyle. Fat deposits were present to a slight extent in normal cartilage, but were definitely increased in the presence of degenerative changes. Microscopic examination showed that the degeneration of the cartilage terminated with the picture of arthritis deformans.

Observations over a five year period showed that 30 per cent of patients with knee trouble left the hospital without a definite diagnosis. This may have been due to lack of knowledge concerning the cartilage surfaces of the joint.

In order to determine what clinical symptoms may occur in supposedly normal knees and what their relationship may be to the pathological findings described, the knees of 400 patients were examined. Of 100 patients under twenty years of age, 7 had tenderness of the joint capsule, 20, pain or tenderness on pressure over the patella, 52, crepitation of various types and 6, pain on kneeling. Most of those with tenderness in the capsule also had pressure pain over the patella and crepitation, the 3 symptoms being concomitant. Of 100 patients from twenty to twenty nine years old, 25 had capsule tenderness, 44, tenderness over the patella, 87, crepitation and 10 pain on kneeling. In addition, many of them had crepitation. Of 100 patients from thirty to thirty nine years old, 10 had enlargement of the infrapatellar fat pad, 30, capsular tenderness, 59, pain over the patella, 93, crepitation and 24, pain on kneeling. Of 100 patients over forty years of age, 40 had swelling of the infrapatellar fat pad, 48, capsular tenderness, 66, pressure pain over the patella, 99, crepitation and 26, pain on kneeling.

These findings suggest the following questions: Does capsular tenderness indicate synovial hemorrhage? Does pressure pain over the patella mean disease of the cartilage? Does crepitation mean destruction of cartilage?

Answers to these questions were found in 23 cases in which autopsy followed the clinical examinations. In all of the cases in which there was capsule tenderness and in all of those with pressure pain over the patella, autopsy revealed injection of the synovial membrane and definite degenerative changes in the cartilage respectively. However, as these changes were often found also in cases in which there had been no clinical symptoms, they are not ruled out by negative clinical findings. Crepitation without degenerative cartilage changes was noted in 2 of the younger patients and in 1 case extensive degenerative changes had not been evidenced by crepitation. In 5 cases there were more pronounced clinical symptoms on one side than the other and this difference corresponded to the difference in the findings on the two sides at autopsy.

Of the 400 cases of supposedly normal knees studied by the author, locking occurred in 14 and effusion in 53. The latter was more frequent in the

older age groups. These symptoms were associated with morphological findings in a sufficient number of cases to justify the conclusion that effusion in the joint has an etiological relationship to chondromalacia.

The author concludes that chondromalacia is a sign of advancing age. It may be regarded as the first sign of arthritis deformans of the knee. The degenerative changes in the cartilage begin within the cartilage at a point near its center. Trauma, either single or repeated, is not of much etiological importance, but probably aggravates a latent disease condition. The most important signs of chondromalacia are palpable fissure formation in the patellar cartilage and pressure pain over the patella. These are both noticed when the patella is pushed medially over the femoral condyle. They may be considered pathognomonic of the disease. The other signs—capsular tenderness, effusion and locking—may be present in other diseases. The locking is not a true locking such as occurs in meniscus trouble, but a sudden painful catch in the movement of the joint which is temporary and leaves a feeling of soreness. Other symptoms are aching after sitting for a long time in a cramped position and pain in the knee on going down stairs or down hill. A ray examination is negative at least in the early stages.

Chondromalacia of the patella may be distinguished from osteochondritis dissecans by roentgen examination. Mild luxations may produce similar symptoms, but usually may be ruled out by the history of trauma. Meniscus troubles, rupture of the crucial ligaments and arthritis deformans are other conditions to be considered in the differential diagnosis, but in their fully developed forms will not be mistaken for chondromalacia.

The treatment of chondromalacia of the patella should be conservative. Restriction of activity, supporting bandages, stimulation by thermotherapy or complete immobilization may be indicated depending upon the severity of the symptoms. Resection of the diseased cartilage has been done with indifferent results. Operation to prevent the later development of arthritis has not been justified by experience. Surgery is indicated only by frequently recurring symptoms causing persistent disability.

WILLIAM ARTHUR CLARK, M.D.

FRACTURES AND DISLOCATIONS

Jones L. and Lieberman B. A. Jr. The Interaction of Bone and Various Metals. Vanadium Steel and Rustless Steels. *Arch. Surg.* 1936, 32: 590.

The authors state that in investigations of the interaction of bone and various metals the exact chemical composition of the metal should be known and the reaction of the metal to the bone as well as the reaction of the bone to the metal should be studied.

For their investigations they chose four alloys—000 of vanadium steel, used for Lane plates of the

Sherman type, and three of rustless steels of different composition. The first of the latter, designated as "nickel free" rustless steel contained a large amount of chromium and no nickel. The second, designated as "high nickel" rustless steel had a low chromium and a high nickel content. The third, designated as "low nickel" rustless steel had a high chromium and a low nickel content.

As the alloy that is free from nickel is soft and easily machined, orders for prostheses given to manufacturers without specification of the formula desired will probably be filled from this alloy rather than from the harder alloys which are much more difficult to machine.

In the authors' experiments tacks were machined from the four alloys and placed in the bones of dogs under aseptic conditions. After the dogs were sacrificed the reaction of the metal to the bone was studied by removing the tacks, weighing them, and computing their loss of weight. The reaction of the bone was determined by fixing, sectioning, and studying the defects created by the tacks.

With the thought that the corrosive effect of serum electrolytes might be a factor in the interaction of bone and metals, four tacks of each metal were immersed in 5 c cm of Ringer's solution for thirty days. In the experiments with nickel free rustless steel and vanadium steel the effect of the electrolytes was clearly evident as early as forty eight hours after immersion of the metal, and at the end of the thirty days a heavy precipitate in the tubes demonstrated extensive corrosion. In the experiments with the chrome nickel rustless steels no corrosion occurred.

The authors conclude from their findings that the alloy of vanadium steel used for the standard Lane plate undergoes rapid corrosion and causes extensive necrosis of bone, and that the nickel free rustless steel, which is also widely used for bone prostheses, produces the same effects to a less degree. They therefore recommend the use of the chrome nickel rustless steels which, although not completely non irritating, undergo minimal corrosion.

RUDOLPH S. REICH, M.D.

Conwell, H. E. *Closed Reduction of Recent Dislocations of the Semilunar (Lunate) Bone*. *Ann Surg.* 1936, 103, 973.

The mechanism causing dislocation of the semilunar bone is extreme hyperextension of the wrist. In extreme dorsal displacement of the wrist, the semilunar bone, being firmly attached to the anterior radio ulnar ligament, does not follow the other carpal bones and is left out of its socket. As the wrist comes back into normal position, the semilunar bone lies anterior to the carpus and is rotated sometimes as much as 180 degrees. This trauma also produces fracture of some of the neighboring bones, notably the scaphoid, os magnum, or the end of the radius. After all wrist injuries a thorough examination, including roentgenography in both anteroposterior and lateral planes, should be made.

If diagnosed early and reduced at once, a dislocation of the semilunar bone should have no serious after effects. It can be reduced by the following procedure. With an assistant maintaining counter-extension at the elbow, the surgeon makes extension on the hand and hyperextends the injured wrist to an extreme degree. Firm continuous pressure is then made with the thumbs on the anterior aspect of the wrist over the dislocated bone, while the wrist is flexed. At the point where the wrist has passed the 180 degree line and is beginning to flex, it is suddenly and firmly forced into full flexion, whereupon the bone usually goes into place with a snap.

Four or five days after the injury, closed reduction is difficult or impossible. In cases in which the dislocation has remained unreduced for seven or eight days a better result will usually be obtained by removing the bone than by attempting either open or closed reduction. However, some authorities have reported good results from late reduction.

Following the reduction, the wrist should be immobilized in moderate flexion with molded plaster splints which include the elbow to prevent rotation. In cases not complicated by fracture, the immobilization should be maintained for a period of about two weeks.

The author reports eleven cases, seven of which were complicated by fracture. In two, the fracture occurred in the lower end of the radius, in two, in the scaphoid and os magnum, in one, in the scaphoid and ulnar styloid, in one, in the scaphoid alone, and in one, in the ulnar styloid alone. In one case reduction was accomplished after nine days, in one, after five days, and in the others, after four days at the latest. Three of the patients returned to full work after five weeks, three, after six or seven weeks, and the others, after from ten to twelve weeks.

General anesthesia is necessary for the reduction. It should be induced preferably by intravenous injection.

Malacia or Kienboeck's lesion has never been noted after these injuries. Trauma is not believed to be of much importance in its causation.

WILLIAM ARTHUR CLARK, M.D.

Moore, T. *Spontaneous Rupture of the Extensor Pollicis Longus Tendon Associated with Colles' Fracture*. *Brit J Surg.* 1936, 23, 721.

Spontaneous rupture of the extensor pollicis longus tendon associated with Colles' fracture is rare. Moore believes that it may be the result of contusion of the tendon caused by the unpadded plaster cast and immediate movement of the thumb. In the three cases he reports it occurred a month or longer after the fracture of the radius. Good functional results were obtained following transplantation of the distal end of the ruptured tendon into the tendon of the abductor pollicis longus.

PAUL C. COLOVNA, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Mayer C. Surgical Treatment of Organic Obliteration of the Arteries of the Lower Limbs (La thérapeutique chirurgicale des oblitérations artérielles organiques des membres inférieurs) *Bruxelles méd.* 1936 16 1090

Mayer states that chronic obliterative arteritis is of two types—the arteriosclerotic type and the thrombo angitis type (Buerger's disease). The method of arteriography recently developed has made it possible to distinguish these two types clearly. In arteriosclerotic arteritis the arteriogram shows marked variations in the caliber of the artery, with areas of narrowing. In thrombo angitis the caliber of the affected artery is reduced throughout the length of the vessel. Arteriography as done in Ranzi's clinic in Vienna has proved to be without danger and in some cases has resulted in clinical improvement.

As Leriche and other investigators have shown the importance of arterial spasm in the production of obliterative arteritis various operations have been devised to overcome spasm in the collateral circulation and thus improve the blood supply of the affected limb. The first of these operations was periarterial sympathectomy. Later in 1924 lumbar sympathectomy was introduced by Diez. At Ranzi's clinic this operation has been performed on seven patients with endarteritis and arteriosclerosis. Resection of the second and third lumbar ganglia was done. The patients were followed up for two years or more. In three the results were excellent but in four there was only temporary improvement.

Another operation that has been performed in cases of chronic obliterative arteritis of the lower limbs is arteriectomy or resection of a segment of the obliterated artery. In the majority of cases resection of the femoral artery in the region of Scarpa's triangle is done. Leriche and Fontaine report good results from this operation in 55.9 per cent of cases of Buerger's disease and 76.4 per cent of those of arteriosclerosis. They regard the operation as the method of choice in obliterative arteritis of the arteriosclerotic type.

The suprarenalectomy suggested by Oppel may be found of value in the early stages of thrombo angitis obliterans but is not suitable for aged patients with arteriosclerosis.

In deciding upon the operation to be done or whether any operation is indicated in chronic obliterative arteritis a careful study should be made to determine the condition of the circulation in the affected limb. For this purpose arteriography is of value, as are also the three following tests: (1) anesthesia of the lumbar sympathetic chain with

novocain (the method of Morton and Scott), which represents a partial physiological resection' of this chain, (2) the typhoid vaccine test of Adson and Brown to determine the degree of the increase in the temperature of the affected member and (3) Denk's test with eupaverine which is a powerful antispasmodic and makes it possible to determine the importance of spasm in the syndrome.

LUCIE M. MEYERS

Fontaine R. Israel L. and Pereira S. A Case of Thrombosis of the Inferior Vena Cava. Thrombophlebitis Simulating Arterial Embolism and Gangrene of Venous Origin (A propos d'un cas de thrombose de la veine cave inférieure. Thrombo phlébitis simulant les embolies artérielles et gangrènes d'origine veineuse) *J de chir.* 1936 47 936

The fact that thrombophlebitis may cause symptoms of insufficiency of the peripheral circulation simulating arterial obstruction due to embolism or some other cause is not generally recognized. Recently Wertheimer and Frieß called attention to this fact, and reported one case of postpartum thrombophlebitis in which the symptoms were those of arterial embolism and two cases in which phlebitis was followed by gangrene.

The authors report two cases, one of them fatal in which puerperal infection was accompanied by thrombophlebitis without the usual symptoms of phlebitis but with pain and cyanosis in the affected leg suggesting arterial embolism. In the case of the patient who died a partial autopsy showed the external iliac and external femoral arteries to be entirely intact but disclosed a recent thrombosis in the corresponding veins. In the other case hysterectomy was done and the patient recovered. As improvement began after the operation the pain and cyanosis in the affected leg subsided and arterial pulsations returned. Before recovery, however, typical symptoms of phlebitis developed. These also subsided. It appears that thrombophlebitis produces symptoms of arterial embolism only in patients in a state of shock with severe infection or with other conditions affecting the general circulation adversely.

Of the two cases of phlebitis reported by Wertheimer and Frieß in which gangrene developed syphilis was present in one and severe anemia in the other either of which conditions may have been a factor in the development of the gangrene. In the authors' case of gangrene due to thrombophlebitis the condition developed in a patient who had always been in good health. The symptoms began after a hard day's work and a misstep on his way home that caused pain in the right groin and thigh. By the next day he had developed a severe pain and

cyanosis in the right leg, symptoms indicative of arterial embolism. However, the temperature of the two legs was equal, the right leg presented a marked edema, and arteriography showed the arteries of the right leg to be normal. After arterial sympathectomy of the common iliac artery on the right side the pain and cyanosis were relieved, only the edema persisted and this also appeared to regress somewhat. Within a few days the right foot became cold and a gangrenous area developed around the heel. Later, three toes also became gangrenous. Amputation was done at the middle of the thigh. At the sympathectomy, the iliac artery was found normal, but a recent thrombosis of the right common iliac vein extending to the inferior vena cava and a sclerotic membrane surrounding the vein, evidently of earlier origin, were found. Examination of the amputated limb showed the arteries to be normal, but disclosed an extensive thrombophlebitis involving not only the large venous trunks, but also the small venous blood vessels. There was no sclerosis. The conditions in this case resemble those found in the thrombophlebitis due to effort which occurs in the upper extremities, the cause of which is not yet known.

Experiments on animals have shown that when the arterial circulation is intact gangrene occurs only when the return circulation is shut off by blocking of all of the veins. Clinically, the collateral venous circulation is so extensive that a sufficiently extensive blocking of the veins to produce gangrene without arterial involvement is rare. Nevertheless, the fact that it may occur under some conditions should be recognized.

ALICE M. MEYERS

Hindmarsh, J., and Sandberg, I. Forty-Five Embolectomies. *Acta chirurg Scand*, 1936, 78: 81.

The authors have followed up forty patients who were operated upon at the Maria Hospital, Stockholm, for embolus of peripheral arteries in the period from 1912 to 1934. Forty-five embolectomies were done. Twenty-six of the patients were women and fourteen were men. Seventy-seven per cent were suffering from heart disease.

The local object of the operation was attained in the cases of twenty-three (51 per cent) of the patients. Of the latter, seventeen (37.8 per cent) were discharged well. Of the others, ten were discharged alive after amputation of the affected limb.

When it is successful, the operation seems in practically all cases to insure local restoration to normal.

It is primarily the condition of the heart that decides the patient's future with regard to capacity for work and duration of life. If complicating disease or weakness of the heart does not supervene, the patient who has been operated upon successfully has the prospect of regaining his capacity for work.

The mortality is high. Of the patients whose cases are reviewed by the authors, two thirds died within ten years after the operation. However, the fact that successful embolectomy permits patients

with embolism, who are generally suffering from heart disease, to regain normal function of their extremities and relieves their pain must not be underrated.

BLOOD, TRANSFUSION

Fowler, W. M. Thrombopenic Purpura, An Analysis of 160 Cases. *Ann Int Med* 1936 9: 1475.

Thrombopenic purpura is characterized by a decrease in the number of platelets, a prolonged bleeding time but an essentially normal coagulation time, a non retracted clot, and a positive constrictor or arm band test. Cases may be classified into 2 main types: (1) the acute or chronic idiopathic type, and (2) the secondary type, due to infections, toxins, drugs, blood dyscrasias, diseases of the liver, and miscellaneous causes. A hereditary type must also be acknowledged. The idiopathic type is most generally attributed to a deficiency of the platelets due to bone marrow insufficiency, but increased destruction of the platelets by the spleen has also been suggested as a cause. Histological examination reveals no uniform change.

The author reports on 160 cases of thrombopenic purpura in which hematological studies were made. Seventeen were of the idiopathic type and 143 of the secondary type. Of the former, 3 were acute and 14 chronic. Nine of the patients with the idiopathic type were adults. Of the 143 cases of the secondary type, 81 were due to blood dyscrasias, 25 to infection, 12 to liver disease, 6 to toxins and drugs, and 19 to miscellaneous causes. In 6 of the cases due to toxins or drugs, the condition was caused by arsenophenamine, in 2, to organic hair dye, and in 1, to benzol poisoning. In all there was an associated severe anemia of the aplastic type.

Splenectomy should be considered only for the idiopathic type. Hence an accurate diagnosis is essential. In many cases of the idiopathic type spontaneous improvement or recovery occurs with advancing age. As remissions can be induced in practically all cases by means of transfusions, it is advisable to watch the patients through one or more attacks to determine the severity and frequency of the hemorrhages. If the hemorrhages continue to be severe, the spleen should be removed during a quiescent period. Splenectomy may result in complete cure or amelioration of the symptoms or may be followed by recurrence of the condition as severe as it was before the operation. Infections, which play a prominent rôle in precipitating attacks, should be eradicated even though they may not be definitely related to the symptoms. In cases of the secondary type the treatment indicated depends entirely upon the primary condition. For immediate control of the hemorrhage the administration of whole blood intramuscularly or, preferably, intravenously, is indicated even though in certain blood dyscrasias it usually has little effect. Splenectomy is contra indicated in secondary thrombopenic purpura as it is acutely fatal in many cases and of no avail in others.

WALTER H. NADLER, M.D.

RETICULO-ENDOTHELIAL SYSTEM

Fischer, E. The Lymphatic Vessels in the Reticulo Endothelial Organs and Their Physiological Involution in the Great Omentum (Die Kenntnis der Lymphgefäße in den reticulendothelialen Organen und ihre physiologische Rückbildung im grossen Netz) *Beitr z klin Chir*, 1936, 163 139

Lymphatic vessels in the parenchyma of the large reticulo endothelial organs (liver spleen bone marrow) have not yet been demonstrated with certainty. On the basis of experiences with the omentum which on account of its many carmine storing cells, is to be included with the reticulo endothelial organs, it seems probable that, for proof of such vessels, the fetal and juvenile phases of development must first be considered. The lymphatic system of the great omentum does not take up particles like that of the diaphragm but plays a rôle in chronic inflammatory changes by forming outgrowths and plexuses. It is very probable that the rests of omental lymphatic vessels undergoing marked retrogression form, later in life the basis of the milk spots which then are so widely spread over the omentum and tend to protect against peritonitis.

The author presents excellent pictures of hepatic and omental lymph vessels which were obtained by the Magnus perhydrol method and the Becher Fischer altering bath and photomicrographed with the ultra pack. The surface of the liver is traversed by a dense network of lymphatic vessels and capillaries which extend into Glisson's capsule close beneath the serosa anastomose with the efferent lymphatic vessels of the hepatic ligaments and probably are connected with the deeper lymphatic vessels that extend into the lobules in the form of pericapillary lymph spaces after leaving the porta. The demonstration of the lymph channels in the great omentum of the rabbit is relatively simple, but the results cannot be applied directly to human beings. In rabbits thirty-six days old the peripheral parts of the omentum are traversed by a dense lymph plexus but later this plexus is limited to the trabeculae. There are numerous anastomoses. In rabbits from four to six months old there is a distinct regression especially of the extensive infiltration of the adipose tissue, and in place of the plexus only single lymph channels remain. Plexuses are found only close to the trabeculae. In rabbits two years old the author was unable to find any plexuses or their discovery was rendered difficult by the marked development of connective tissue and fat. In human beings it has so far been impossible to find

lymphatic vessels in the fetal omentum, but in the mature omentum they have been demonstrated in the thinnest areas where as in animals, they extend along the blood vessels and omental trabeculae. Valvular formations, disputed by Marchand, are not as numerous as in rabbits but they are present. Typical plexuses are absent, but occasionally fine processes composed of simple endothelial tubes have been found. (STEVENS) CLARENCE C. REED M D

LYMPH GLANDS AND LYMPHATIC VESSELS

Goldstein J D. The Gordon Test for Hodgkin's Disease. *Am J M Sc*, 1936 191 775

In 1923 Gordon reported that an encephalitic syndrome of characteristic pattern developed in rabbits given intracerebral injections of lymph glands removed from patients with Hodgkin's disease. This reaction was obtained in nineteen of twenty cases of Hodgkin's disease which he studied. Suspensions of glands removed from forty-one patients suffering from a variety of other conditions did not produce it. The nature of the agent responsible for the reaction has not been definitely established.

The author presents briefly the method used in making the so-called Gordon test. In his investigations the material employed consisted of twenty-nine lymph nodes, none of which came from patients proved to have Hodgkin's disease by histological study and twenty of which were obtained from patients who were clinically suspected to have Hodgkin's disease but in whom the presence of that condition was not demonstrated by histological study. The cases of Hodgkin's disease and the results of the rabbit test in each are reported.

Seven of the nine lymphogranulomatous nodes inoculated intracerebrally into rabbits produced the encephalitic syndrome. Of the control group of twenty lymph nodes, five were tuberculous and two came from patients with infectious mononucleosis. None of the control glands produced signs of encephalitis on inoculation into rabbits.

In the opinion of the author these observations suggest that the so-called Gordon test may be of distinct value in the diagnosis of Hodgkin's disease, especially when the histological findings are uncertain. At the present time a negative test has no diagnostic significance. Although in the reviewed cases there were no false positive tests additional cases must be studied to determine whether false positive tests are possible.

HERBERT F. THURSTON, M D

SURGICAL TECHNIQUE

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

Novak, E. Gas Phlegmon (Ueber Gasphegmonen)
Orvostudium, 1935, 25 166

The occurrence of gas phlegmon is dependent upon many external and internal factors. The external factors are the season, the weather, the condition of the soil, the clothing, the condition of the skin, and the method of transportation. The internal factors are the patient's general condition, shock, the state of the tissues of the injured part, and the relationships and disposition of the infecting organisms. The 2 latter are the determining factors. The severity of the infection depends in part upon the number of the infecting organisms and in part upon their characteristics, their relationship to each other, and their virulence. The mixing of anaerobic bacteria and aerobic bacteria usually causes severe infection. From the practical standpoint, 4 types of frequently occurring anaerobic organisms which are pathogenic to man are differentiated: the bacillus *perfringens* (Welch Fraenkel), the vibron septique (Pasteur) or para gas gangrene bacillus, the bacillus *oedematis* (Novy), and the bacillus *histolyticus* (Weinberg).

According to war statistics, the time of the appearance of gas phlegmon after a wound is as follows: first day, 21 per cent of the cases, second day, 33 per cent, third day, 15 per cent, from the fourth to the sixth day, 6 per cent, seventh and eighth days, 3 per cent, and from the ninth to the twentieth day, 1 per cent.

As gas phlegmon is chiefly a disease of the musculature, the fact that it occurs $4\frac{1}{2}$ times more frequently in the extremely muscular thigh than in the leg is easily explained.

The mortality varies according to the location of the wound. In cases of injury of the thigh and trunk it is from 50 to 62 per cent, in those of injury of the arm and leg, from 21 to 28 per cent, and in those of injury of the forearm, 15 per cent.

The first symptom of developing gas phlegmon is pain. When the infecting organisms enter the blood stream in larger numbers and are not destroyed there, the condition is called "anaerobic sepsis" and death is the result of paralysis of the respiratory center. The cause of the failure of the respiration is dissolution of the blood corpuscles, the visible sign of which is icterus. It must be admitted that in some cases gas gaining access to the heart and the central nervous system in large amounts may cause paralysis of vital organs.

Of chief importance in the treatment is prophylactic serum therapy. For already developed gas phlegmon surgery is essential. To supplement surgical treatment bactericidal substances are employed.

In the nursing of patients with gas phlegmon special care should be taken that they do not soil themselves with intestinal contents. In the administration of salt solution or a solution of adrenalin and salt the greatest care must be taken to avoid introducing the needle beneath the fascia. The already developed gas phlegmon should be treated surgically without delay. Exceptions to this rule are the cases in which large incisions or amputations will not be tolerated. In such cases the sepsis must be combated with large doses of serum. The dangers of serum are anaphylactic shock and serum sickness.

At the Verebely Clinic in Budapest 14 indisputable cases of gas phlegmon have been treated since 1914. In the same period of time the number of severe phlegmons due to pyogenic organisms which have been treated has been 180 and the total number of operations performed has been 40,000.

In summarizing, the author states that, even including the time of the World War, gas phlegmon has been rare in Hungary as compared with western countries. Prophylaxis consists of prompt and sufficient surgical treatment. The prophylactic injection of serum is not a substitute for surgery, it simply supplements the latter. Without doubt, the incidence of cure is considerably increased by the use of serum. It is proper to give the gas bacillus serum simultaneously with the antitetanus serum. In very serious conditions these sera should be injected around the wounded area. The treatment of fully developed gas phlegmon is surgical, but even in this condition the administration of serum is an excellent supportive measure. Serum makes the most severe cases suitable for surgical treatment and, in addition, renders it possible to use more conservative surgical procedures. The injection of large amounts of serum in cases of fully developed gas phlegmon should be done only after the patient has become desensitized. In severe cases, good results may still be expected after the injection of doses of from 200 to 300 c cm. The application of vitamin rich salves (cod liver-oil vaseline) greatly hastens healing of the extensive wounds resulting from large incisions and denudations and may render corrective operations unnecessary.

In general, gas bacillus serum should be kept in readiness in large quantities in all surgical institutions and in pharmacies.

(E. ILLES) HARRY A. SALZMANN M.D.

Hertel, E. A Contribution on Latent Gas-Bacillus Infection (Ein Beitrag zur ruhenden Gaseodeminfektion) *Beitr. z. Klin. Chir.*, 1936, 163 261

It is known that pyogenic infections frequently remain latent for a considerable time. This is seldom true of tetanus and gas-bacillus infections. Coener

found only eight cases with a latent period. Later, several additional cases with a latent period, which in only a few exceeded one year, were reported. Ruch reported one case with latency for twelve years, Hendry one with latency for ten years and Krymord, one with latency for fifteen years.

The author's case was that of a man who sustained a wound of the thigh from a shell fragment in 1916 had experienced radiating pains for four years, and had been treated for sciatica. For the last several weeks before the patient consulted Hertel the pain had been nearly unendurable. A roentgenogram showed a small shell fragment behind the trochanter. An infiltration the size of the palm of the hand with no inflammatory manifestations, was found in this region. On August 17, 1934 an incision was made a cherry sized shell fragment in a brown slimy capsule excised and the wound drained. The non hemolytic staphylococcus albus and sarcina citrea but no anaerobes were found. On August 18 there was marked sensitivity distal to the fowl wound. On re examination of the wound, a yellowish green edema of the subcutaneous tissue, cellular tissue and muscle spaces and gas bubbles were found. There was marked distention. By August 19 gas edema with crepitation involved the entire thigh, hip and groin. Two large longitudinal incisions were therefore made down to the vascular bundle and the sciatic sheath. Both revealed yellowish edema and gas infiltration. An intravenous continuous drip infusion of 100 c cm. of gas bacillus serum was given. On August 20 the temperature was 39.4 degrees C. the general condition was poor and there was granular disintegration of the muscles. Improvement then occurred gradually and by October 21 the patient was cured. The report is accompanied by two illustrations.

In spite of the lack of bacteriological proof this was a typical case of gas gangrene. Typical was the absence of inflammatory redness and pus and especially the initial pain which has been emphasized by Franz Pfanner and Juengling and should have suggested the condition. According to the findings of Snader Flassmann the pain is due to changes produced in the nerve ends by the toxin. The salmon color of the muscle noted on incision in the author's case should also suggest the condition. The picture resembles first of all that of the so called epifascial gas phlegmons of Payes which, however according to Coenen and others are to be sharply differentiated from the ordinary gas gangrene. These are mixed pyogenic infections. According to Coenen the focus of specific gas bacillus infections without suppuration is always in the muscle. In the author's case there was no pus. Hertel attributes the favorable outcome to the gas bacillus serum and the early, multiple long incisions.

As a rule latent gas bacillus infections flare up after operations for the removal of retained missiles or other surgical procedures such as amputations. Therefore the pre operative prophylactic administration of gas bacillus serum as well as tetanus

serum is indicated. This was omitted in Hertel's case. In the treatment of the condition large doses should be given (Loeche). This is evident from the fact that they render the course less severe. Without such treatment 50 per cent of the late cases are fatal and in most of the others amputation is necessary. (FRANZ) LEO M. ZIMMERMAN MD

ANESTHESIA

Keusenhoff W. The Present Status of Evipan Narcosis. Observations on More Than 1000 Cases. (Der heutige Stand der Evipan Narcose Beobachtungen an weit ueber 1000 eigenen Faellen) Fortsch. d. Therap. 1935 11 705

The author reports his experiences in more than 1,000 cases of evipan narcosis. Most of the narcoses were of short duration. In addition to the usual minor and moderately extensive surgical procedures evipan narcosis is preferred for operations performed with electricity on account of the danger of explosion which is associated with the use of other anaesthetics and for transurethral interventions when local anaesthesia proves insufficient. In prostatectomies for which spinal anaesthesia was not indicated evipan narcosis after initial local anaesthesia proved satisfactory. It was found of value also after other local anaesthetics. In many cases it was used as a basic narcotic for all important operations such as laparotomies, rectal amputations, nephrectomies, and radical interventions in osteomyelitis and mammary carcinoma. For longer complete narcosis it was used seldom but as a basic narcosis it has displaced avertin. The dosage is not based on an invariable rule but determined with consideration of the age, condition, disease and reaction of the given patient. Older patients require a smaller dose than younger ones. Evipan narcosis is suitable also for children. Slow injection of an always freshly prepared solution is essential. Special preparation of the patient is generally not required. In abdominal surgery infiltration of the subcutaneous tissue with pantocain is done to prevent pain usually produced by incision of the skin.

Evipan may be used repeatedly without danger. Venous thrombosis is not to be feared even when paravenous injection occurs. Vomiting, excitation and prolonged postoperative sleep are no more frequent than when other narcotics are used. In the author's cases a decrease in the blood pressure and the occurrence of respiratory disturbances were not observed. Marked temporary mydriasis is of no significance. Evipan is not suitable for patients with disease or disturbance of the liver or with asthma but if the dose is carefully regulated it can be used for those with even very severe uncompensated heart failure. The author sees no reason why it should not be used in inflammatory or purulent diseases of the neck although the only death in his cases was that of a sixty-eight year-old man with a prostatic condition who died after the incision of bilateral parotid gland abscesses. With the ex-

ception of this unexplained death, there was no severe accident or harmful reaction. In emergency cases, local anesthesia and ether *rausch* is preferable (HUBMANN) CLARENCE C REED, M D

Perman E. Avertin Anesthesia in Children. Twelve Hundred and Fifty Avertin Anesthetics (Die Äthernarkose bei Kindern 1250 Avertin narkosen) *Nord med Tidsskr*, 1935, p 2089

The unfavorable early experiences with avertin anesthesia in the cases of children (Borchart, Haas, Nordmann) were apparently due to too high dosage. In 1929, Siewers, of Leipzig, reported 1,200 avertin anesthetics induced in the cases of children, and in 1932, Drachter Oberniedermayer, of Munich, reported 3,700 in which there were no fatalities attributable to the anesthetic.

At the Crown Princess Louise Nursing Home for Sick Children, 1,250 avertin anesthetics were induced in the period from 1932 to October 31, 1935. A 3 per cent solution, freshly prepared each time, was used. The evening and the morning before the operation a cleansing enema was given. There was no preparation with drugs (luminal, opiototal). The children fell asleep after a few minutes. Ether was then given, in addition, to obtain the necessary depth of anesthesia. Avertin anesthesia alone was sufficient in only 10 per cent of the cases, as a rule it was only the basic anesthesia. However, the amount of ether necessary was usually very small, often not more than from 10 to 20 or 30 c cm. If the operation required lasted less than an hour, a cleansing postoperative enema was given.

The question of dosage is important. The normal dose for children from two to ten years old is 0.125 gm per kilogram of body weight, for children less than a year old, from 0.08 to 0.10 gm, and for children more than ten years old, 0.10 gm. The administration of more than 50 c cm of ether was necessary in about 20 per cent of the cases. In the cases of patients with marked dehydration, severe peritonitis, or ileus, avertin anesthesia is not used, but for the surgical treatment of all other conditions in children it has completely displaced anesthesia induced with ether alone. As the amount of ether used is small there is no increase in the bronchial secretion. The use of force, screaming and struggling of the patient, psychic shock, and the fear of another anesthesia are eliminated.

(GERLACH) LOUIS NEUWELT, M D

Wiggin, S C. The Present Status of Ether Anesthesia. *Anes & Anal*, 1936, 15 105

The author traces the history of anesthesia, reviews the improvements in nitrous oxide oxygen-

ether anesthesia, discusses the use of spinal anesthesia and of the barbiturates and avertin, defines balanced anesthesia, and describes the various methods of inducing anesthesia with ether.

He states that the disadvantages of ether are overcome to a great extent by proper preparation of the patient and proper administration of the ether. He lists the indications and contra indications of ether anesthesia.

He believes that the anesthetist should be acquainted with the patient and should make his own examination to determine the method of anesthesia most suitable for that individual. He should choose the anesthetic only after consultation with the surgeon and the patient. Before the operation the diet should be low in fat and high in carbohydrates, and for twenty four hours a large quantity of fluids should be given unless this is contra indicated. At 8 o'clock the night before the operation some form of hypnotic should be administered. In the morning nothing should be given by mouth. One hour before the operation a dose of morphin atropin or morphin scopolamine should be administered, the dose being determined according to the age of the patient. For adults of average size the dose of morphin sulphate is $\frac{1}{6}$ gr, and that of atropin, $\frac{1}{100}$ gr. With the use of the carbon dioxide absorption apparatus on the latest nitrous oxide oxygen sequence machines, the patient is medicated much more heavily than for the inhalation administration of ether by the semi closed towel cone. If an emergency operation is to be performed in less than an hour, morphin should be omitted and only atropin should be given.

Wiggin favors induction of the anesthesia in a semi darkened room where the patient should not be strapped to the table and no attempt at surgical preparation should be made. He discusses the method of induction in detail and reviews the complicating factors and their treatment. He states that the ether should be removed from the patient and de etherization with oxygen begun as soon as possible. He outlines the routine postoperative care, and discusses the treatment of pulmonary complications.

Of 2,230 surgical operations reviewed, 1,593 were performed under ether anesthesia, 298 under spinal anesthesia, and the remainder under nitrous oxide-oxygen or avertin anesthesia or local anesthesia. Of the 53 deaths, 8 were those of patients operated upon under ether anesthesia and 31 those of patients operated upon under spinal anesthesia. Only 1 death was directly attributable to ether anesthesia and only 2 deaths were attributable to spinal anesthesia. HAROLD C OCHSNER, M D

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

McWhirter R. Radiosensitivity in Relation to the Time Intensity Factor. *Brit J Radiol* 1936 9 287

By the term intensity the author means the number of r units per minute. The relative value of high and low intensity in the treatment of malignant disease is a controversial problem of economic as well as scientific importance. Prolonged irradiation with such low intensities as 3 r per minute increases the cost of irradiation therapy and limits the field of application of such treatment with the facilities ordinarily available. The study reported in this article was undertaken to determine whether the results of this form of treatment are superior to those obtained with higher intensities.

In order to obtain comparable findings variables other than intensities were kept constant. Treatments were given at intervals of twenty four hours over a fixed total period of one week. Both radium and x rays were used but the former in specially constructed external applicators was selected for the greater number of the experiments because it offers more constancy of output which is very essential. Practical homogeneity over the treated area was obtained by selecting distributions with a variation not exceeding ± 5 per cent. The dosage was measured by means of a small ionization chamber of the Sievert type. One hundred and forty separate experiments requiring from 500 to 600 applications of radium or x rays were carried out.

In the investigation of the biological response 2 chief methods were used. First the response of normal tissues was determined by irradiating healthy skin and later the effect of the irradiation on superficial tumors was studied. In normal skin all variations of gamma ray intensities up to 100 times produced similar reactions.

To determine the effect on tumors 4500 r delivered continuously over one week was selected as the minimal lethal dose for rodent ulcers. For carcinomas a dose of 5000 r was considered suitable. The minimal lethal dose was selected in the belief that if low intensity irradiation is superior to higher intensity irradiation the tumors would take longer and longer to disappear and finally would fail to show any effect when the intensity was increased. Twenty four cases are analyzed and the results tabulated. All except 2 of the patients were well over a period of at least eighteen months. In the case of one of the 2 exceptions an underdosage was given, and in the treatment of the other the tumor was not irradiated completely. The results obtained appear to indicate that under the condi-

tions of the experiment, low intensity methods yield no more satisfactory results than high intensity methods.

Variations of x ray intensities based upon the effect produced in normal skin gave almost the same results as the gamma rays of radium. Even though the highest intensities used were more than 100 times greater than the lowest, there was no appreciable variation in the reaction.

In discussing radiosensitivity as related to cell mitosis, the author attempts to assess the validity of the hypothesis that cells are especially vulnerable to irradiation when they are in the premitotic stage and that therefore continuous irradiation is best for the destruction of tumor cells during this phase. He states that it is quite evident that epitheliomas can be destroyed with either high or low intensities, and it is highly improbable that the irradiation of short duration with high intensities will act on cells only in this sensitive period. It therefore appears logical to conclude that the important difference between tumor cells and normal tissue cells is one of variation of sensitivity of the adult cell and that this variation is independent of the premitotic sensitive phase.

In conclusion McWhirter states according to the results of radium irradiation the low intensity methods have no biological superiority over high intensity methods. In the x ray series of experiments the cases were too few to be conclusive but the wide range of intensities employed should have demonstrated variations with the intensities normally employed in practice.

ABRAHAM HARTUNG MD

Sievert R M and Forsberg A. The Time Factor in the Biological Action of Roentgen Rays. *Acta radiol* 1935 17 290

The authors report investigations of the death rate of *Drosophila* eggs after irradiation with about 165 r for periods varying from thirty nine hundredths to one and sixteen hundredths seconds, which corresponds to irradiation intensities of from 24000 to 7800 r/min. They compare the results with those previously obtained with the same dose given in from two and one tenth seconds to thirty minutes.

A critical study of the possible sources of error indicated the probability that the effect of the irradiation diminishes when the irradiation time is very short. The findings of the experiments showed that when the irradiation time is thirty nine hundredths seconds the death rate is reduced by more than 20 per cent. However the authors are of the opinion that experiments with still greater intensities will be necessary to confirm the results.

Cardillo, F. Immediate Results of Roentgen Irradiation at a Short Focal Distance (Primi risultati della irradiazione roentgen a breve distanza focale) *Radiol med*, 1936, 23 326

The literature on "plesioroentgentherapy," or Chaul's method, is still very scanty. Cardillo discusses the nature and technique of the method, its results as compared with those of radium and ordinary X ray treatment, its field of application, and its economic aspects. He then reports twenty-three cases of neoplasms of the face and lip (one melanoma and twenty-two epitheliomas) which were treated by this method at the Milan Cancer Institute. The study was limited to cases which were relatively simple from the technical and therapeutic standpoints, the plan being to extend the researches later. In twenty-two (95.7 per cent) of the cases an immediate cure was obtained. However, the treatment was given too recently for a report of the end results. In the one case in which the treatment was unsuccessful the lesion was a recurrent carcinoma invading bone.

The author concludes that there is no true analogy between the physicochemical conditions in plesioroentgentherapy and radium irradiation. It can be said definitely that in cases of cutaneous tumors the Chaul method gives at least as good immediate results as radium. The duration and character of the reaction to the two methods is the same except that in plesioroentgentherapy the first signs of reaction and improvement occur before half of the total dose has been given, i.e., after the administration of from 2,500 to 3,000 r, the reaction is more sharply delimited, and, as may be predicted theoretically, the course and reaction are more nearly uniform. If, after several years' experience, it is found that the two methods give identical results the comparative advantages and the criteria for the use of each will be determined by the site of the tumor, its superficial extension, and its deep infiltration. Plesioroentgentherapy has a more limited field than radium irradiation. While one or another form of radium treatment can always be substituted for the Chaul method, the reverse is not true.

With regard to the comparison of plesioroentgentherapy and the usual forms of x ray therapy for cutaneous cancer, Cardillo states that excellent results can be obtained by the most varied techniques. Without discussing the comparative merits of these, he emphasizes that, if success in this condition is due to the greatest possible sparing of healthy tissue, this requirement, especially with regard to the deep tissues, is met incomparably better by the Chaul method than by any other form of roentgentherapy.

The economic advantages of the Chaul apparatus to cancer clinics is difficult to estimate. In the combined surgical and irradiation treatment of tumors of the mouth, this apparatus is not of great advantage and in gynecology it cannot replace radium. On the other hand, plesioroentgentherapy is ambulatory and will release the available supply of

radium for the treatment of the patients who need it most.

The article is accompanied by diagrams, photographs, and synoptic tables. M. E. Morse, M.D.

Sanderson, S. S. Irradiation of the Entire Body by the Roentgen Ray. A Preliminary Report of Twenty-Two Cases. *Am J Roentgenol*, 1936, 35 670

Roentgen irradiation of the entire body was suggested in 1907 by Dessauer. Subsequent reports—by Murphy and Nakahara in 1922, Kok and Vorlaender in 1923, and Caspari in 1924—indicated that it is an effective method of therapy. In 1927 Teschendorf reported that in cases of leukemia and Hodgkin's disease it prolonged the periods of remission. Since then it has become known in Europe as "Teschendorf's method."

The entire body is exposed to hard irradiation filtered by 0.5 mm of zinc and 2 mm of aluminum at a distance of 180 cm. From 3 to 5 per cent of an erythema dose is given in small daily amounts applied alternately to the front and back or opposite sides of the body. In America, the method has been used notably by Heublein. Heublein advocated continuation of the exposure over a period of many days. This modification was based on the following four facts:

- 1 Cells are most sensitive to roentgen irradiation when they are immature or in an active state of division.

- 2 The body builds up a certain resistance to neoplastic processes under effective irradiation therapy.

- 3 General body irradiation causes the retrogression of tumor masses with smaller doses than are necessary in local treatment.

- 4 Local irradiation cannot control certain types of neoplastic diseases which tend to become widely disseminated early.

The author reports twenty-two unselected cases in which treatment by roentgen irradiation of the entire body was given at the Massachusetts General Hospital, Boston. The factors of the technique were a 200 kv. peak, 4 and 6 ma., filtration with 0.5 mm of copper, and a distance of 2.25 meters. The irradiation was given to the entire body at one time. No part of the body was shielded. The output varied from 20 to 48 r per hour. The condition for which the treatment was given was Hodgkin's disease in eight cases, lymphatic leukemia in four cases, mycosis fungoides, polycythemia, and myelogenous leukemia in three cases each, and acute leukemia in one case. The best results were obtained in Hodgkin's disease, polycythemia, and myelogenous leukemia. While the number of cases of each type was small, the results indicated that improvement can be brought about by general roentgen irradiation when the patient has ceased to respond to local therapy, and that this response is obtained with relatively small doses. The author believes that further trial of the method is justified,

and that efforts should be directed toward improving the technique

HAROLD C. OCHSNER M D

RADIUM

Kaplan I I The Five Grain Radium Pack. *Am J Roentgenol* 1936 35 498

In the majority of cases of surface malignancy radium irradiation has distinct advantages over all other methods of treatment. Moreover gamma rays have a more effective biological action on tumor tissue in the interior of the body than the usual forms of x rays even though the depth dose from roentgen rays is presumably greater. It is estimated that 1,000,000 volts would be required to produce roentgen rays equivalent to gamma rays.

For a study of the effect of intensive radium therapy over a long period of time with the use of fractional daily doses in amounts sufficient to destroy neoplastic tissue in the interior of the body without permanently injuring normal tissues through which the irradiation passes the use of the 5 gm radium pack was considered necessary. This pack is a valuable addition to the armamentarium for the treatment of malignancy.

A filter equivalent to 4 mm of platinum is used with a portal measuring 8 by 10 cm and a 6 cm distance from the skin. Five thousand milligram hours are given in one hour. This amounts to 30 per cent of a skin erythema dose. Seventeen thousand five hundred milligram hours in a continuous application is equivalent to a threshold erythema. This is about 5,500 mgm/hr more than the skin erythema dose produced by similar packs of 4 gm of radium with less filtration. With greater filtration and a consequently shorter wave length a greater amount of irradiation is necessary to deliver the required dose. The shorter the wave length the longer the interval between the exposure and the appearance of the erythema. With the use of a 3 mm platinum filter a dosage of 17,500 mgm/hr is followed by an erythema in from four to six weeks. The erythema from the usual roentgen treatment appears at about the fourteenth day. There is also a variation in the character of the erythema produced by roentgen rays. When 200 kV, 5 ma, 0.5 mm of copper 1 mm of aluminum and a distance of 60 cm are employed, the skin erythema reaches its peak in from sixteen to eighteen days. It is assumed that this is the optimum time duration for the proper administration of divided doses of protracted external irradiation.

It is found that while the depth dose from roentgen rays at a distance of 10 cm and filtered by a mm of copper amounts to 40 per cent and the depth dose from the 5 gm radium pack at a distance of 10 cm is 14.2 per cent the biological effects of these x ray and gamma ray dosages are apparently about equal. By phantom and cavity experiments carried out during operations and on cadavers and with the use of photographic films as indicators of relative intensity, it was found that when the uterus is 11 cm from the surface the depth dose in the uterus from

the 5 gm radium pack is 14 per cent and the depth dose in the cervix 35 per cent. By placing the films in sterile rubber containers in various parts of the body after application of the colpostat and the uterine sound loaded with radium, the relative intensities in their various orders were ascertained. In comparisons of the Coard method of irradiation with treatment with the 5 gm radium pack in cases of lesions of the mouth and throat it was found that from 3 to 3 3/4 skin erythema doses from the radium pack had greater biological effectiveness over the same number of days than from 3 3/4 to 5 skin erythema dose of roentgen rays with a 2 mm copper filter. The epithelitis and epidermitis appeared earlier after the roentgen treatment but each lasted thirty-one days.

The author concludes that the radium pack produces an effect upon tissues and tumors similar to that of the roentgen rays. Normal tissues are more profoundly affected by radium than by the roentgen rays and tolerate interstitial irradiation less well than roentgen irradiation. Interstitial irradiation is very effective in destroying the average squamous cell carcinoma of a low grade of malignancy. Selective irradiation with the radium pack or roentgen rays may not destroy tumors of this type entirely.

The article includes intensity charts reaction curves and case reports. A JAMES LARKIN M D

Duffy J J Advantages and Disadvantages of the Radium Element Pack. *Am J Roentgenol* 1936 35 508

The evaluation of the radium-element pack as compared with the 200-kv x ray apparatus is very difficult. Statistical methods are of little aid as very few cases of cancer in a curable state are treated by external irradiation alone. The author discusses the advantages and disadvantages of the pack from three aspects: the physical, the mechanical and the clinical.

The effective wave length from the element pack corresponds to highly filtered roentgen rays produced at 1,500,000 volts. The usual exposure with the pack is two hours per day. Therefore it takes three days to give 24,000 mgm/hr at a distance of 6 cm or six days if both sides of the neck are to be treated with a total dosage of 48,000 mgm/hr. While it was formerly thought, and is still believed, that the tissue dosage to the tumor is the most important factor, the duration of the treatment plays an increasingly important part. Five hundred and forty r the threshold erythema dose with the use of 200 kV, 0.5 mm of copper and a distance of 50 cm could be electrically duplicated by exposure for one hundred and ninety minutes to the radium element pack at a distance of 6 cm. If the differential effect between the skin and the tumor is as great as observations seem to indicate, the skin will tolerate three times as much irradiation expressed in radium percentages as in roentgen ray percentages. The greatest disadvantage of the radium pack is its limited applicability, since dis

tances greater than 6 cm. are to a large extent impractical. The constant emission of irradiation from the radium pack might be considered an advantage but, today, breakdowns in roentgen machines are few.

From the mechanical standpoint the radium pack is bulky and heavy, and its application to cervical regions in the cases of obese patients, to the axilla, to areas at which operation has been performed, and to the perineum is extremely difficult. In the cervical regions too broad a beam of irradiation often obtains, but this can be overcome by increasing the distance and narrowing the beam to a smaller area. The duration of treatment with the pack can rarely exceed two to two and one half hours on account of the cramped position of the patient. With regard to the cost of radium Duffy states that clinical results cannot be judged by a financial standard.

From the clinical viewpoint the author has come to the conclusion that better results are obtained with the radium pack than with roentgen rays. In the use of gamma rays the difference between the effect on tumor tissue and the effect on the skin is greater. These are clinical impressions, however, and cannot be proved statistically. As efficient clinical results are obtained with the pack as with roentgen rays, although the reaction to the gamma rays occurs later.

At the time of operation in thirty nine cases of operable carcinoma of the breast treated surgically six weeks after the completion of a radium pack cycle, marked or complete clinical regression of the disease was found in from 80 to 90 per cent. In 28 per cent there was no microscopic evidence of carcinoma although biopsy was positive before irradiation in all cases. Statistical proof of these improvements will not be forthcoming for several years. Binkley favors the pack for cases of rectal carcinoma. In Hodgkin's disease, Craver obtained better results with the pack than with the roentgen rays. Ultimately the condition of the skin is markedly better after the use of the element pack than after roentgen irradiation. Telangiectasis is absent and brawny induration is much less common. A disadvantage of the use of the pack is that the margin of safety between a sharp reaction and definite, prolonged injury with permanent damage to the irradiated tissue is much narrower.

The author summarizes by stating that, according to clinical impressions and judgments, the radium pack is superior to 200 kv. roentgen therapy, and since radium element is limited in amount and flexibility, every attempt should be made by artificial means to approach the type of irradiation emitted by the radium element pack.

A. JAMES LARKIN, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Norris E H The Thymoma and Thymic Hyperplasia in Myasthenia Gravis with Observations on the General Pathology *Am J Cancer* 1936 27 421

Norris reviews the literature on thymoma and thymic hyperplasia in myasthenia gravis which has appeared since Bell's comprehensive report on the subject published in 1917. Bell found reports of fifty six autopsied cases of myasthenia gravis. Of these the thymus was enlarged in seventeen and contained a tumor in 10. Norris found the records of six more autopsied cases. In five of these, thymic lesions were discovered. Of the four personal cases he reports, he found thymic lesions in two. He believes that the frequency of the discovery of pathological changes in the thymus in myasthenia gravis depends upon the care with which such changes are sought and that in some of the reported cases thymic lesions which had produced little or no macroscopically evident change in the supra-pericardial tissue may have been overlooked.

He presents a chronological summary and brief review of the cases he collected from the literature and discusses the findings in his own four cases. In two of the latter, marked hyperplasia of the thymus was observed, while in the two others there was no gross evidence of thymic involvement. The author classifies the so called benign tumors of the thymus found in half of the reported cases of myasthenia gravis as conditions of extreme epithelial hyperplasia, and the conditions which have been regarded as an enlargement or persistence of the thymus as conditions of moderate epithelial hyperplasia.

HAROLD C OCHSNER M D

Burke M Multiple Primary Cancers *Am J Cancer* 1936, 27 316

Burke presents two tables of cases of cancer from the University of Wisconsin. Table 1 lists forty six cases of true multiple primary cancers representing 7.8 per cent of a recent series of cases of cancer coming to autopsy. In this series the most common type of multiple cancer the basal celled epithelioma was conspicuous because of its rarity. Table 2 lists seventeen cases which failed to satisfy all of the rigid criteria for multiple cancers but presented interesting potentialities.

The author states that a higher incidence than can be explained on the basis of chance is of important significance with regard to the roles of heredity (susceptibility) and environment (irritation injury) in the development of cancer. The light that can be shed on these factors by statistical study alone is

decidedly limited. However, while statistics cannot prove, they suggest that instead of susceptibility of a single organ system in an individual, as is often postulated there is frequently a more general dyscrasia (heredity?) which results in a widespread abnormal reaction to environment (irritation). The increase in the mortality of cancer has been commonly ascribed to two factors (1) improvement in diagnosis and (2) the fact that, because of the lengthening of life greater numbers of persons now reach the cancer age. Any factor producing an increase in single cancers is bound to produce at least a corresponding increase in multiple cancers.

JOSEPH K NARAT M D

GENERAL BACTERIAL, PROTOZOAN, AND PARASITIC INFECTIONS

Troisier J Bariéty M and Brocard H Curable Staphylococcal Erysipeloid Septicemia (*L'érysipélaïde staphylococcique curable*) *Presse méd* Par 1936 44 80r

In 1926 George and Giroire described an erysipeloid form of staphylococcal septicemia characterized by a peculiar cutaneous lesion. The lesion develops about a tiny port of entry, usually a facial furuncle in the nasolabial region. Very soon there develops an edema of the adjoining tissues, and at the end of four or five days the temperature rises to 40 degrees simultaneously with the appearance around the furuncle of an inflammatory plaque resembling erysipelas. The plaque is violet and often cold to the touch. Its margin is not definitely raised. Frequently pustules and more rarely blisters appear on its surface. This lesion is associated with a hyperacute staphylococcal septicemia. The authors believe that a number of supposed cases of erysipelas previously reported were in reality cases of this affection.

The mortality of staphylococcal septicemia in general is about 73.5 per cent. Giroire reported that in erysipeloid staphylococcal septicemia death occurs usually within a week and in some cases from twenty four to forty eight hours after the onset. Lemierre likewise reported a most grave prognosis in these cases although he had observed cases with a slightly longer course. Some cures have been recorded. The authors report two cases with a favorable outcome. Of twenty nine cases reported in the literature twenty two were fatal and seven cured. The mortality is highest in the cases in which the lesion occurs on the nostril or the upper lip its most common site. Its occurrence at other sites such as on the temple, the neck, the trunk and the limbs seems slightly less dangerous. Worm reported a cured case in which the lesion was on

the forehead. In neither of the authors' cases did the lesion develop following a preliminary cutaneous staphylococcal infection. In one, it was due to the propagation of a dental infection through the maxillary cellular tissue, and in the other to septicemic metastasis. It therefore appears that the lesions of internal origin are less often fatal than those of external origin.

Recently Ramon's antistaphylococcal anatoxin combined with antitoxic serum has given good results in generalized staphylococcal infections. Eventually it may reduce the high mortality of the condition. Hitherto, treatment has appeared futile. One could only hope for spontaneous recovery, and when this occurred there was danger of relapse. In both of the two cases reported by the author the cure was apparently spontaneous as in the one case in which the Ramon anatoxin was used it was administered at such a late stage that its efficacy could not be judged. EDITH SCHACHE MOORE.

DUCTLESS GLANDS

Hodges, P. C. Skeletal Changes in Disturbances of the Parathyroid Glands. *Radiology*, 1936, 26 663

The parathyroid glands react to rises and falls in the calcium ion concentration of the blood in the same manner that a delicate thermostat responds to rises and falls in temperature. When the calcium ions fall, more hormone is put out by these glands, when they rise, less is produced. When bound to protein, calcium produces no effect whatever.

The hormone thus measured out in response to fluctuations in ionized calcium produces no direct chemical effect upon the constituents of the blood plasma. However, it controls the rate at which calcium and phosphate are returned to the blood as the result of the breakdown of old bone.

In parathyroid adenoma or hyperplasia an excessive amount of hormone is poured into the blood and the resulting rise in the plasma calcium fails to suppress the further output of hormone or else acts only at abnormally high levels.

Following total removal of normal parathyroids or of normal glands plus adenomas, parathyroid hormone disappears from the blood and the circulatory stimulus to osteoclast activity is lost. As a result, in the absence of local stimuli such as fractures and infections, the osteoclast activity de-

creases to the minimum and there is almost no return of calcium and phosphate from the bones to the blood.

The skeletal lesions demonstrated by x-ray examination in hyperparathyroidism are described and shown by illustrations. In discussing the differential diagnosis, the author considers Paget's disease, osteomalacia, giant cell tumors, bone cysts, and regional fibrosis. J. FRANK DOUGHTY, M.D.

Moller, W. A Case of Recklinghausen's Osteitis Fibrosa Generalisata with a Parathyroid Tumor Which Was Operated upon Successfully (Erfolgreich operierter Fall von Osteitis fibrosa generalisata — Recklinghausen — mit Parathyreoideatumor). *Acta chirurg. Scand.*, 1936, 78 182

The author reports a case of Recklinghausen's osteitis fibrosa with a parathyroid tumor in a woman forty-four years old. As the result of increasing pains in the arms and legs and difficulty in walking the patient had become almost a complete invalid. A slight increase in the blood calcium (11.1 to 12 mgm per cent) was found. Roentgen examination revealed extensive changes in the bones with decalcification particularly in the vault of the skull, multiple cyst formations, some of which were of considerable size, and a spontaneous fracture of the left humerus. Microscopic examination of curetted cystic tissue disclosed the picture of osteitis fibrosa and giant cell tumor.

Removal of the parathyroid tumor, which measured 14 by 12 by 14 mm and was located partly within one lobe of the thyroid, was followed by a sudden fall of the serum calcium to 5 mgm per cent. A slight latent tetany with blood calcium values of about 6 mgm per cent for fourteen months then developed. Treatment with A.T. 10 caused a temporary rise in the blood calcium to 11 mgm per cent. Repeated roentgen examinations of the bones showed a continuous increase in their calcium content with disappearance of the cyst formations until the calcium content and structure were practically normal and practically ideal healing of the spontaneous fracture occurred. Two years and two months after the operation the patient was entirely well and able to work.

On the basis of this case and the literature the author discusses the most important symptoms of osteitis fibrosa generalisata and some of the problems related to parathyroidectomy.

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INTERNATIONAL ABSTRACT OF SURGERY

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COLLECTIVE REVIEW

MALIGNANT LESIONS OF THE COLON

A REVIEW OF THE LITERATURE FROM JULY, 1935, TO JULY, 1936

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A REVIEW of about 100 articles from the literature in English, Spanish, French, and German on the subject of carcinoma of the colon shows rather close conformity of opinion concerning certain signs and symptoms of malignant disease of the large intestine and the incidence of these lesions in the various segments of the intestine. The difficulties encountered in advancing the factual evidence regarding the etiology are a matter of general knowledge, and there is a growing accord in the feeling that the solution of the problem is becoming a more intimate and personal responsibility. That methods of treatment are being improved at a more rapid rate is evident, but regardless of the value of the accepted forms of procedure, the results show a wide variation due largely to the condition of the patients and differences in judgment and skill in carrying out the steps in the operative technique.

ETIOLOGY

It is obvious that each step in the advancement of the knowledge of disease subdivides the subject into more minute parts and enlarges the scope and possibilities of future studies. This has been true of neoplastic disease of the rectum. For instance, Santy and his associates and Junghanns, subscribing to Lambing's definition of villous tumors, have made extensive investigations and have written at length regarding particular stages in the evolution of these neoplasms. They suggest that coincident with villous tumor there may be a predisposition to proliferation in various

organs, and they call attention to the confusion that arises from the relative frequency of secondary malignant degeneration of villous tumors, but state that certain histological differences exist between dendritic epithelioma and the simple villous growths. The opinion of Fansler (2) is that all epithelial tumors except those of the degenerated fibrous type present some danger of malignant degeneration and that some of these tumors, especially the flat, button like lesions, are often malignant from their earliest onset, but that the majority of pedunculated lesions are, in the beginning at least, benign adenomas. Martin and many others have stated that rectal adenomatous polyps constitute the most dangerous, as well as the most common predisposing factors in the development of rectal adenocarcinoma. Hardy estimated that malignancy occurs in more than 40 per cent of polyps, and remarked that polyps occur most frequently in the large intestine. Junghanns, in a discussion of the work of Schmieden and his coworkers, emphasized that 70 per cent of the malignant lesions in 130 specimens removed at operation from the large intestine had an unquestionable relationship to intestinal polyps. In 7,000 postmortem examinations, Lawrence found that polyps were approximately 12 times more common in the colon than in the small intestine, and that the incidence more closely approached that of malignancy in the sigmoid and rectum than in any other region of the gastro-intestinal tract. Nystroem attributed the development of carcinoma of the large intestine

to polyps in as high as 63 per cent of the cases, and assumed that there is an hereditary disposition to polyps in from 50 to 60 per cent. Felsen observed that polyps with long pedicles rarely become malignant, and that those with very short pedicles quickly become sessile, flat, and broad, when malignancy supervenes.

Reed and Anderson projected an interesting array of possibilities as to factors of influence in the causation of carcinoma of the intestine when they asked if there may be some predisposing element which favors the development of chronic ulcerative colitis and carcinoma as a sequel and complication of amebiasis, and whether there is any relationship between carcinoma and deficiency of Vitamin G or Vitamin B. Individual susceptibility to some such factor may initiate the pathological process of carcinoma.

Spangler stated that in his opinion there is an hereditary element influencing the incidence of carcinoma, and that if accurate data can be obtained, it will be found that there is usually a history of carcinoma in the forbears of a child in whom the disease develops. Carcinoma does not respect age, for it occurs in infants as well as adults. Primary carcinoma of the intestinal canal is the form that develops most commonly in children. However, Martin and others maintain that, as regards the forms of carcinoma which affect human beings, heredity is as yet unproved but that there is justification for tentatively accepting a theory of congenital or acquired predisposition.

INCIDENCE

In all of the statistics there is striking uniformity of opinion concerning the frequency of occurrence of carcinoma in the various segments of the bowel, and concerning the mortality. (Shaw) Partsch (2) concluded that about a third of the tumors are in the right half of the colon, a third in the sigmoid, and a third in the transverse segment and the left side of the colon. In Mallory's series of 3,535 cases of gastro-intestinal malignancy (quoted by Shaw) 57.54 per cent of the lesions were in the large intestine. In a very careful review of a much smaller group of cases Rosser (1) found that carcinoma was most frequent in the rectosigmoid.

SYMPTOMS AND SIGNS

Spangler urged painstaking research and judicious correlation of associated facts since the beginning of the disease and the first symptoms seldom coincide and often there is no suggestion of the presence of the disease, such as stenosis, compression, perforation, or hemorrhage until there is

interference with the function of some important organ. Even when carcinoma of the colon causes a disturbance, the presenting symptoms are not sufficiently definite to establish a certain diagnostic criterion for all cases. Rosser (2) noted that carcinoma of the cecum and ascending colon apparently simulates chronic appendicitis in more than two thirds of the cases, except that there is weakness due to anemia, and fever is absent. Constipation is perhaps the most predominant complaint of patients who have growths in the mid colon although the presence of blood in the stools and diarrhea are not infrequent. Two-thirds of Rosser's patients with carcinoma of the descending colon and sigmoid had constipation and colic, and about a fourth had continuous diarrhea.

In my experience and that of my colleagues, the most common erroneous diagnosis in the presence of carcinoma of the cecum or the right side of the colon is unexplained secondary anemia, pernicious anemia, peptic ulcer, cholecystic disease, or appendiceal abscess. If the growth is in the left side of the colon the erroneous diagnosis is more likely to be appendicitis, colitis, spastic colon, or disease of the adnexa. Colitis and hemorrhoids take precedence among erroneous diagnoses when the growth is in the rectum.

Steindl mentioned that in 22 per cent of a series of cases of inoperable carcinoma, the condition became inoperable because of errors in diagnosis. Manson Babr urged diagnosticians not to lose sight of the fact that severe diarrhea may be an accompaniment of intussusception, diverticulitis, polyposis, and malignant lesions. Salvin concluded that intussusception occurs most frequently in young persons and in the upper segments of the intestine and that intussusception of the sigmoid into the rectum is rare. According to Sinjajev, ileus is more likely to be a complicating factor in persons past middle age and in many of these there is a co-existing volvulus. Both intussusception and ileus may be associated with carcinoma. While the presence of other disease may help to obscure the situation, Cade expressed the belief that, regardless of attending difficulties, rectal examination and intelligent use of the roentgen ray should permit early diagnosis in 90 per cent of the cases, and the reason that only 40 per cent of the lesions are recognized early is that the physician is unable to convince many patients of the necessity for a thorough examination. In his estimation, the predominant symptoms of disease in the right side of the colon are likely to be weakness, loss of weight, dyspepsia (gaseous disturbance early in the course of the complaint), pain of an aching character (rarely colicky) in the right

side of the abdomen, a change in bowel habits, and constipation (rarely marked). The leading symptoms of disease of the left side of the colon are those of obstruction, and since this portion of the bowel is not so important physiologically as the right side, these symptoms do not occur early. Blood with the stool is a fairly constant observation when carcinoma is in the left side of the colon.

Rankin (1) stated that bleeding occurs in 85 per cent of all carcinomas of the rectum at some time during the course of the disease, and in more than half of the cases it occurs as the initial symptom. If a polypoid lesion is present, profuse mucopurulent fluid diarrhea usually constitutes the predominating symptom, and in most cases blood will be observed in the stool, colic and flatulence are usually present (Nystroem). The significance of pain in the right iliac fossa is emphasized by Gordon Taylor and others, who are of the opinion that pain in this region in middle-aged and older patients always should awaken the suspicion that a constricting carcinoma of the distal part of the colon is present. A hydrocele that develops suddenly may be of tuberculous or neoplastic origin. Pain and bleeding were the chief manifestations of carcinoma of the rectum in Ramirez Calderon's cases. The presence of a symptomless fistula may still further complicate the diagnosis, as in a case reported by Carnot and Caroli.

DIAGNOSTIC PROCEDURE

Improvements in the technique of roentgenographic examination very likely are responsible for the greatest recent advancement in the control of carcinoma as they have made possible the detection of an increasing number of early lesions. Non obstructive growths of the colon and rectum are difficult to detect on account of the variability in the length of the pelvic loop, its motility, and a tendency toward overlapping which obscures the outline of portions of the intestine. Spasms of the intestine, the position of the patient, and lack of canalization interfere with the demonstration of filling defects of the pelvic part of the colon, but in certain cases, according to Thompson and Soper, the use of a gravity flow barium enema in conjunction with roentgenographic study will be found of distinct advantage. The detection and differential diagnosis of granuloma were aided by proctosigmoidoscopic examination in Yeomans' (2) experience. According to Hummel, the recognition of polyposis is not particularly difficult, an accurate clinical distinction between inflammatory infiltration and annular carcinoma requires far greater diagnostic acumen.

Hartmann (2) stated that the popular impression regarding the preponderance of inflammatory strictures in women is misleading, in his cases the incidence of such strictures in women was 56 per cent, not 80 per cent.

In many cases of carcinoma of the rectum the simple procedure of digital examination will reveal the growth. As this examination is often omitted, regardless of suggestive signs and symptoms, there is need of a radical change in the attitude of physicians and laymen toward rectal complaints, and in the scope of physical examinations. If the growth is in the lower part of the sigmoid, the use of a proctoscope will be required. Jirasek reported 3 cases in which digital, proctoscopic, and roentgenographic examination failed to reveal the carcinoma, and explained his experience by the manner in which carcinomas grow and the fact that not all of these lesions affect the mucosa. According to the opinions recorded by physicians in diverse parts of the world, it is their intention to emphasize the need of "cancer consciousness" and the judicious use of methods and equipment in correlation with the history of the symptoms, in order to increase the frequency of early and correct diagnoses. Olanczyk suggested more frequent use of the proctoscope in the clinical examination to reduce the incidence of error in the pre operative diagnosis, for definite knowledge that the growth is benign may spare the patient an unnecessarily radical operation and an artificial anus.

OPERATIVE PROCEDURE

The advancements in the science of medicine have widened the horizon of operability for carcinoma of the large intestine, and careful attention to minute details in the pre-operative preparation has been rewarded by a decrease in the risk of the surgical procedure.

From the number of times mention is made of pre-operative immunization against peritonitis, it is evident that there is growing recognition of the value of the use of vaccine as a preventive measure, according to Herrmann, Weinstein, and Milone. D F Jones teaches that a dry, well-cleaned colon and proper technique will preclude infection at the time of operation. Gordon-Watson stated that the use of the Furness clamp offers a distinct advantage in the control of contamination. MacGuire divided the intervention into several stages, and used special surgical means to prevent the infection which is often attributed to clamping.

The treatment of lesions of the bowel should be as radical as the conditions demand. To be most successful, it must continue to be an indi-

1 stage, and Devine favors a 1-stage operation for certain types of lesions of the right side of the colon. Chaton stated that while the 1-stage procedure is of advantage because it subjects the patient to the risk of operation only once, he likewise reserves it for selected cases. The problem of carcinoma of the rectum is of considerable importance, since it is estimated that 5 per cent of all deaths from carcinoma are due to carcinoma of the rectum (Wheeler), and this regardless of evidence (Devine) suggesting that lesions of that region progress slowly and metastasize late in their course. The fundamental technique of the method of Coffey has been used advantageously by Nyström, del Valle and his associates, Hartmann (1), and Gaudier for the ablation of carcinoma of the rectum and rectosigmoid. The sacral route of approach is employed by Gold and Stitzko in the majority of their operations for malignant lesions of the rectum. Pannett resects the intestine by the abdominosacral method and restores continuity of the intestine. Successful transrectoscopic resection has been reported by Zehr. Thermocautery resection of a large scirrhous tumor of the descending colon with gun-barrelled colostomy afforded complete relief from advanced malignant lesions, according to Mayer. For lesions of the right half of the colon, Burt performs a primary ileocolostomy and resection in 1 or 2 stages. He stated that although the so-called obstructive resection or modified Mikulicz operation is employed occasionally for malignant processes in the right side of the colon, those in the left colonic segment seem to be more amenable to this procedure. Noehren, Murdoch, and many others have from time to time attested to the value of the refined Mikulicz method. According to Murdoch, the Paul operation is applicable to carcinoma of the transverse colon and middle part of the sigmoid in selected cases.

Since constipation is such a prevalent complaint it is worthy of mention, especially since observers such as Finsterer (2) are prompted to make the statement that anastomosis for constipation does not improve the patient's condition and in most instances makes it worse. If stasis of the ascending colon renders interference imperative, Finsterer fixes the cecum to the lateral wall of the pelvis, and if that fails, he follows the suggestion of von Schmieden and performs left hemicolectomy.

Because of the serious danger of malignant transformation of polyps and the fact that such tumors occur most frequently in the large intestine, palliative measures such as cecostomy and appendicostomy should be excluded, except under

unusual circumstances. Complete removal is not recommended by Hardy and by Santy, Mallet-Guy, and Croizat.

Chronic ulcerative colitis. A review of disease of the colon would be incomplete without mention of chronic ulcerative colitis. The greatest advance in the treatment of this condition is the tendency to reserve surgical intervention for cases in which there is no response to medical treatment (Donati). If operation is indicated, ileosigmoidostomy may suffice, however, if the lesion is extensive, colectomy may be required, according to Lardennois.

Colostomy. One scarcely needs to mention the expediency and value of colostomy if the procedure is carried out on proper indication and the stoma functions properly. Weinstein stated that the secret of successful colostomy is the formation of a good spur to prevent leakage to the lower loop. Prolapse of the intestine through the stoma is another troublesome complication. Means of circumventing and correcting the protrusion have been devised by Weinstein, Gabriel (1), and Warwick. Ebner and Huet suggested a remedial plan of procedure for prolapse following amputation of the rectum. Daland, Welch, and Nathanson presented statistics showing that patients who undergo colostomy for irremovable malignant lesions of the rectum live no longer than those who are untreated, and stated that the comfort of the patient is the only consideration in the formation of an artificial anus when radical excision is not contemplated.

Reduction in risk and mortality. Changes in basic procedures have reduced the mortality, both immediate and remote. Dominici stressed the importance of preserving the blood supply of the colon, especially the small vessels which run along the points of insertion of the appendices epiploicae. Many other detailed technical points have been mentioned by various surgeons.

The immediate after care is important in minimizing the complications and the surgical risk. Herrmann safeguarded against proctitis by having the patient chew gum, and D. F. Jones emphasized the advantage resulting from the prevention of intra-abdominal pressure. Healing may be facilitated by maintaining physiological rest of the bowel.

RESULTS

In discussing the possible influence of the duration of the disease on the ultimate result of treatment of carcinoma of the rectum and sigmoid, Weitkamp restated the observation that about one year is required for the disease to surround

three fourths of the rectum, and about eighteen months to surround the rectum completely. Extension subsequently occurs through the lymphatic structures and finally reaches the liver by way of the venous circulation of the portal system. Pannett and Gabriel, Dukes, and Bussey have noticed that lateral or downward lymphatic spread in carcinoma of the rectum is found only in late stages of the disease when the hemorrhoidal lymphatic structures are blocked by metastasis. However, the delay of the patient in presenting himself for treatment is a counter influence for Raiford found the condition inoperable in about 53 per cent of cases at the time of admission to the hospital. Finsterer (1) obtained complete recovery of 60 per cent of his patients who were treated for carcinoma of the rectum. In T. E. Jones (1) series of cases, 52 per cent of the patients were well at the end of five years. Boland stated that contrary to the former belief more abundant lymphatic drainage to the right side of the colon for some reason does not favor rapid metastasis. Furthermore the ultimate results may be improved if due consideration is given to the fact that there may be multiple concurrent primary growths as in the case reported by Partsch (1) and that subsequent to operation, another primary malignant lesion which may be just as amenable to treatment as the first growth when it was discovered may develop. Cases of such postoperative primary lesions have been reported by Young and many other surgeons. Behind seemingly partisan statements concerning methods of treatment there is real sincerity of purpose which is bound to advance the science in the future.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Voss O. The Surgery of Fractures of the Base of the Skull on the Basis of an Experience of Twenty Five Years (Die Chirurgie der Schädelbasisfrakturen auf Grund 25 jähriger Erfahrungen) 1936 Leipzig Barth

Twenty five years ago the author made a departure from the conservative treatment of fractures of the base of the skull which even today is almost the only treatment given. He was led thereto by successful results from operations which he performed in two cases of such fractures.

In the course of the last twenty five years he has treated 122 cases in the hospital. One hundred and four of the fractures were in the region of the ear or lateral base of the skull and 18 in the region of the nose and orbit that is the anterior cranial fossa. The difference between the two numbers was due to the fact that before 1929 his material included no nasal injuries. Of the 104 fractures of the lateral base of the skull 66 were operated upon and 38 were treated conservatively. Of the 18 in the region of the anterior cranial fossa 11 were operated upon and 7 were treated conservatively. Voss says that it is not to be understood that when fractures of the base of the skull were operated upon they were approached from the convexity. In fractures in the region of the temporal bone and the anterior cranial fossa the fracture is better approached from the base and the operation should be done by the ear and nose surgeon.

Fractures of the base of the skull alone are less frequent than combined fractures of the convexity and base. In the author's cases of fracture of the lateral base there were 12 fractures of the base alone and 54 combined fractures whereas in his cases of fracture in the region of the anterior cranial fossa the corresponding figures were 7 and 4.

Voss discusses the various theories of the mechanism of origin of fractures of the base of the skull. He states that the severity of the injury to the auditory canal is determined not by the intensity of the force applied but by the site of its application and its direction on the petrous portion of the temporal bone. The most common sites of particularly severe injuries appear to be the occiput and a posterolateral site close to the mastoid process. The view of some surgeons that the bone injury in fractures of the base of the skull is of almost trivial importance as compared with the brain lesion is opposed vigorously by the author. Injuries of the anterior and lateral base of the skull are comparable to compound fractures.

It is not always easy to make a differential diagnosis between fractures from excessive bending and fractures from cracking as anamnestic data are often lacking. Bending fractures are usually due to a direct force and cracking fractures to an indirect force.

Of the fractures of the base of the skull on which this report is based, 79.5 per cent healed and 20.5 per cent resulted in death. Of the fractures in the region of the lateral base 49 were operated upon and cured, 17 were operated upon but resulted in death, and 38 healed without operation. Of the fractures in the region of the anterior base 4 were operated upon and cured, 7 were operated upon but resulted in death, 6 healed without operation and 1 which was not operated upon resulted in death. Voss regards the relatively low mortality as particularly noteworthy because the cases were referred from the surgical clinic on account of their special severity.

The cause of fracture of the base of the skull was a traffic accident in 44 cases, a fall from a considerable height in 33, a fall from a lesser height in 15, an occupational accident in 10, a blow on the head in 7, an accident occurring in sports in 6, injuries from a fall and collision in 3, a war injury in 2, and an unknown cause in 1.

The fractures of the petrous portion of the temporal bone are divided by Voss into longitudinal fractures in which involvement of the middle ear is an important feature, transverse fractures which involved the internal ear, combinations of longitudinal and transverse fractures, combinations of oblique fractures of the posterior cranial fossa and transverse fractures, combinations of oblique fractures of the posterior cranial fossa and longitudinal fractures, partial and complete fractures of the pyramids, partial and complete fractures of the mastoid process and isolated fractures of the tegmen tympani. The most unfavorable prognostically were the combined longitudinal and transverse fractures. All of the 4 cases of this variety were fatal. The prognosis of the longitudinal fractures was favorable. Of the fractures of this type 39 healed and only 7 were fatal.

The clinical signs of the fractures of the petrous portion of the temporal bone were involvement of the auricle, suppurations in the region of the anterior cranial fossa and the mastoid process, involvement of the auditory canal which was a frequent accompaniment of longitudinal fractures, hemorrhages from the ear (in 32 per cent of the cases), hemato tympanum or cerebrospinal fluid tympanum, and the escape of cerebrospinal fluid (when this occurs there must be a fracture of the bone in the region of

the labyrinthine capsule with opening of the sub-arachnoid space, chiefly in the porus acusticus internus, and a coincident perforation of the drum) In Voss' opinion the escape of cerebrospinal fluid is alone a sufficient indication for operation. Herniation of the brain substance was observed only 3 times. In longitudinal fractures paralysis of the facial nerve usually become apparent either immediately after the accident or a few days later. From the findings of microscopic examination the author concludes that the opinion of Nimier that the axis-cylinder injury is caused by extravasated hemorrhages is probably correct. As the nerve is not torn, its good regenerative capacity is easily understood. In pyramidal fractures, paralysis of the facial nerve was associated in every case with total deafness and absence of response to vestibular stimulation.

The author observed only 1 exception to the rule that total deafness followed transverse fractures. In pyramidal fractures there was complete loss of function of the cochlear and vestibular portion of the internal ear even when there was no paralysis of the facial nerve. On the other hand, longitudinal fracture did not always result in deafness. In one third of the cases of longitudinal fracture, if those of deafness with internal ear symptoms are excepted, there were labyrinthine symptoms (vertigo sometimes typical vertigo associated with a sense of movement of external objects, nystagmus, past pointing, and a tendency to fall).

The roentgen findings are discussed in detail. The author usually made 3 examinations, 1 by the Lange-Sonnenkalk method, 1 by the method of Stenvers, and 1 by the method of Mayer. Each of the 3 methods has its advantages. The Stenvers method proved particularly valuable for the demonstration of labyrinthine fractures, while Mayer's method was found preferable for that of longitudinal fractures.

Of 38 cases in which the roentgen and operative findings were compared, they agreed well in 19. In 12, operation revealed more than the roentgenograms, and in 5, the roentgenograms more than the operative findings.

The author next discusses in detail the indications for surgical treatment of skull fractures. In 8 cases in which operation was performed because of symptoms of intracranial pressure, there were 2 deaths, in 7 in which it was performed for diffuse purulent leptomeningitis there were 4 deaths, in 18 in which it was performed because of suspected endocranial complications there were 6 deaths, and in 16 in which it was performed for secondary infection in the region of the middle ear and mastoid process there were 3 deaths. In 3 of the latter there was a simple acute inflammation of the middle ear, in 1, an acute middle ear suppuration with extensive polypus formation, and in 12, an acute middle ear suppuration with extensive polypus formation associated with mastoiditis. The 3 deaths occurred in the last group. One patient was operated upon for an acute exacerbation of a chronic middle ear suppuration, 1, for longitudinal fracture with suspected frac-

ture of the posterior wall of the auditory canal with paresis of the facial nerve, 6, for a certain or probable transverse fracture of the petrous portion of the temporal bone, and 7, for combined basal and longitudinal fractures. One of the latter died. All these cases are critically discussed in detail.

The signs of fractures of the base of the skull in the region of the anterior cranial fossa were as follows: purulent meningitis in 6 cases, 5 of which terminated in death, severe injury in 2 cases, with death in both, late infection of the frontal sinus and the ethmoid bone in 1 case, and fracture of the roof of the orbit with involvement of the accessory sinuses in 2 cases. The danger of meningitis is greater in fractures in the region of the anterior cranial fossa than in fractures in the region of the lateral base of the skull.

With regard to the choice between conservative and operative treatment the author warns against operation during the first two days and against operating on children with fractures in the region of the anterior base of the skull.

statistics the spinocellular or mixed forms are the most frequent

The cancers develop as local lesions and even when they invade a labial, buccal, or ocular mucous membrane secondarily are hardly ever complicated by lymphatic metastasis. Imbert has attempted to determine the early clinical signs of the infiltrating stage. He states that malignancy is to be suspected especially in lesions with a fairly regularly rounded form which are limited by a well defined elevated border surrounding a crater. As soon as the infiltrating stage is definitely recognized physiotherapeutic methods should be abandoned for wide surgical excision. In grave cases of cancer of the face all physical methods including radium therapy should give way to radical surgery repeated if necessary. In very advanced cases radium therapy in cavities remains a useful aid.

KOBZAR II IVI MD

Cavernagh J B Cavernous Sinus Thrombosis
Brit J J 1936 1 195

Cavernous sinus thrombosis was first mentioned in 1818 by Abercrombie in describing a postmortem finding. A clinical diagnosis of the condition was first made in 1839 by Virg. The first authentic recovery was reported in 1893 by Bircher. Operation for the condition was first performed in 1902 by Dwight and Germain. A review of the literature shows that thrombophlebitis of the cavernous sinus is rare and generally fatal.

From the anatomical standpoint the cavernous sinus is remarkably vulnerable to any pyogenic infection of the head and neck. The acute fulminating type of cavernous sinus thrombosis which is usually associated with septic lesions of the face usually terminates in death. The gradual insidious onset of the chronic compensatory type commonly associated with lesions of the middle ear and mastoid, tonsillar region and neck may render diagnosis difficult and delay surgical intervention. The majority of recoveries occur in cases of this type.

In reviewing all cases of cavernous sinus thrombosis reported up to 1926 and his own personal observations, Eagleton made an important contribution to the study of the condition. On the basis of the character and the mode of onset of the thrombosis the cases were classified as being of the acute fulminating or the chronic compensatory type and on the basis of treatment they were classified according to whether (1) major surgery was directed at the cavernous sinus itself (2) accessory surgical measures were employed to deal with the primary source of infection and to drain formed abscesses (3) serotherapy, blood transfusions and other measures were used to combat general blood stream infection, or (4) recovery resulted spontaneously without treatment. Only one patient with the acute fulminating type (Eagleton's patient) recovered as the result of operation upon the cavernous sinus itself combined with ligation of the common carotid artery. The only other recovery after operation upon the sinus itself occurred in a case of cavernous sinus

thrombosis of the chronic compensatory type following a mastoid infection which was reported by Bircher. The remaining twenty to forty recoveries followed an operation draining the primary source of infection and the channel of approach or occurred spontaneously. In approximately half of the cases the condition was of aural origin.

Since 1926 twelve cases of recovery have been reported. Of the cases of the acute infective type, operation was performed on the cavernous sinus itself in three, and in two of these ligation of the common carotid was done. Four cases were treated by accessory surgical measures and serotherapy or blood transfusion. Of the patients with chronic compensatory thrombosis one made a spontaneous recovery and the remaining four were treated by accessory surgical measures without operation on the cavernous sinus itself. Five of the twelve patients lost vision in one eye.

The author reports a case of the chronic compensatory type in which recovery resulted. The infection apparently began in the left middle ear and led to an infection and thrombosis of the lateral sinus and jugular bulb. An extension of the thrombosis to the posterior part of the cavernous sinus gave rise to venous stasis in the orbit of the opposite side and later in the orbit of the same side. As meningitis did not occur this extension was probably not septic. The center of the infection in the vein was apparently in the jugular bulb, a large abscess pointing in the neck was evacuated. The collapse of the internal jugular vein and an aseptic thrombus at a lower level saved the patient from a descending general blood stream infection. The treatment was limited to drainage of well localized abscesses.

In the acute fulminating type surgical attack upon the cavernous sinus as well as general blood stream therapy may be necessary for cure. In the chronic compensatory type interference with the protective thrombus in the cavernous sinus itself is dangerous. The majority of recoveries follow conservative surgery such as accessory surgical measures and blood stream therapy.

The cavernous sinus may be approached by the following routes:

1 Through the sphenoidal sinus. The restricted field and the difficulty of illumination even by Cushing's technique render this route unpopular.

2 Through the floor of the middle fossa. Approach by this route is an extensive undertaking. In one of the recent cases was this route followed.

3 Through the orbit, by opening the outer wall by the formation of an osteoplastic flap and removing the eye. This appears to be the route of choice though often it requires the sacrifice of a sound eye.

Eagleton was the first to insist not only upon eradication of the primary focus and drainage of the route of invasion but also upon ligation of the internal or common carotid artery to place the cavernous sinus at rest by eliminating the currents and eddies set up within the sinus by the transmitted pulsation of this artery. Lauwers and Christophe

adopted the latter measure in conjunction with exposure of the sinus by the formation of an external orbital osteoplastic flap. Eagleton decried the suggested dangers of the procedure, attributing severe cerebral complications which followed it in three cases to other factors. However, because of the possibility of such complications this procedure should be used only in cases of the more desperate type.

The author emphasizes the importance, in the diagnosis and treatment, of a daily blood culture and a daily differential blood count. For transfusion he uses the blood of immunized donors. The donors are injected from time to time with minimal doses of a mixed stock vaccine prepared from the organisms usually responsible for infections of the ear, nose, and throat. Just prior to the transfusion a larger dose of the mixed vaccine or, when possible, of an autogenous vaccine from the patient's organisms, is given intravenously. In this way both agglutinins, and bacteriolytic ins are increased in the donor's blood. This is of the greatest importance in the treatment of the desperate type of acute case.

In conclusion, the author says that in the acute fulminating infective type of thrombophlebitis of the cavernous sinus, a combination of direct operation on the cavernous sinus itself, blood stream therapy, and ligation of the internal or common carotid artery is necessary for better results in the future.

Of the approximately thirty cases of the chronic compensatory type which have been reported two were treated by operation on the sinus itself and one was treated by blood stream therapy. The rest, including one of the author's cases were treated expectantly and by accessory surgical measures for the eradication and drainage of the primary focus, channels of invasion, and formed abscesses.

JOHN C. KIRKPATRICK, M.D.

Grove, W. E. Septic and Aseptic Types of Thrombosis of the Cavernous Sinus. Report of Cases. *Arch Otolaryngol*, 1936, 24, 29.

Thrombosis of the cavernous sinus was first described by Duncan in 1821 and first reported clinically by Vigla in 1839. While it is not rare neither is it frequent.

There are three common types of the condition: (1) the marasmic, which is sterile, (2) the traumatic, and (3) the infective. Cases may be subdivided also according to the site of the original focus, which may be in the ophthalmic tract, the pterygoid plexus, the sphenoid bone, the aural tract, the tonsils, or the carotid venous plexus.

The common offending organism in the infective type is the staphylococcus albus.

The typical symptoms fall into three groups: those due to venous stasis, those due to involvement of neighboring nerves, and those due to sepsis.

When exophthalmos of one eye followed by swelling of the lids and chemosis of the bulbar conjunctiva develops on the side of the body with a pre-existing focus of infection the diagnosis is not difficult.

The results of operative interference on cavernous sinus thrombosis have been very disappointing. Some surgeons believe that the incidence of recovery is lower when operation is done than when surgery is not attempted.

JOHN F. DELPH, M.D.

EYE

Walt, H. Diathermic Treatment of Giant Holes in the Retina. *Arch Ophthalmol*, 1936, 16, 173.

Retinal detachment caused by disinsertion at the ora serrata responds well to diathermic treatment even when the hole extends over more than one-fourth of the circumference. The prognosis of the operative treatment of retinal detachment is usually less favorable the larger the hole. However, detachment caused by small holes may sometimes present more difficulties than detachment caused by relatively large holes.

Besides the large horseshoe shaped holes and the typical disinsertion occurring in young persons, there are two forms caused by giant tears which the author believes respond well to diathermy. These are the traumatic form and the pseudodisinsertion found with high myopia.

VIRGIL WESCOTT, M.D.

Campbell, E. H. The Relationship of Sinusitis to Optic and Retrobulbar Neuritis, with Special Reference to Etiology and Treatment. *Arch Ophthalmol*, 1936, 16, 136.

Most of the early investigators of the cause of retrobulbar neuritis believed that infections of the sinuses were responsible for the condition. It is now recognized that many of the signs and symptoms of retrobulbar optic neuritis which disappear for a time as the result of operation upon the ethmoid and sphenoid may be due to multiple sclerosis, toxins and toxic conditions, tumors or cysts, acute infectious diseases or foci of infection.

VIRGIL WESCOTT, M.D.

EAR

Kelemen, G., Davis, E. D. D., Scott, S., Deacon, J. N., and Others. Disturbances of Function of the Ear Following Injury. *Proc Roy Soc Med*, Lond., 1936, 29, 1114.

KELEMEN states that injuries of the ear may be divided into 2 groups—those in which the petrous bone shares in a general damage of the other parts of the skull, and those in which the injury is limited to a disturbance of hearing or equilibrium.

Lesions due to trauma must be judged with consideration of the secondary inflammation and should be treated according to the general principles of everyday practice.

DAVIS says that disturbances of the function of the ear are common following motor accidents for which compensation is claimed. The difficult cases are those of alleged concussion deafness in which an internal ear, labyrinthine, or nerve deafness arising from the concussion of a head injury is assumed. In

Davis experience nerve deafness resulting from injury in civil life is very rare. Because of its deep position and its structure the internal ear seldom sustains anatomical or permanent damage except in severe and almost always fatal injuries.

SCOTT expresses the opinion that the comparative infrequency of nerve deafness in cases of fracture of the base of the skull is due to the infrequency of survival after transverse fracture of the petrous bone.

DEACON says that otitis media is common in cases of fracture. Of 236 fractures of the skull S_2 were compound and 45 were compound through the middle ear. Of the patients with fractures of the latter type 12 died but none of meningitis. Of the 33 who survived 21 had acute suppurative otitis. Five of the latter were subjected to a mastoid operation and all survived. These patients had various degrees of deafness of the conductive type but no tinnitus or vertigo.

JAMES C. BRASWELL, M.D.

Luescher E. The Importance of Otomicroscopy in the Diagnosis and Treatment of the So Called Secretory Middle Ear Catarrh. *J. Laryngol. & Otol.* 1936 51 454.

The author states that the diagnosis of secretory middle ear catarrh is based on the demonstration of a fluid discharge in the tympanum.

This demonstration is considerably simplified by investigation with the ear microscope of ten or more magnifications which shows the limits of the discharge in the tympanum with great clarity, rendering visible even the smallest quantities of fluid.

Otomicroscopy permits recognition of the following five forms of discharge in the tympanum which depend upon the amount of the fluid and the air mixture: (1) a hanging drop behind the umbo; (2) irregular fluid lines resulting from capillary forces; (3) classical surface lines; (4) a liquid froth composed of air bubbles; and (5) liquid drops with air fissures.

JAMES C. BRASWELL, M.D.

Lund R. The Indications for the Labyrinth Operation with Special Reference to Acute Diffuse Destructive Labyrinthitis. *J. Laryngol. & Otol.* 1936 51 425.

Lund states that in the first six of the last twenty-eight years it was believed that diffuse destructive labyrinthitis should be treated radically; in the next eight years that it should be treated conservatively; and in the last fourteen years that the indications for labyrinthectomy should be based on the findings of examination of the cerebrospinal fluid. The best results were obtained in the last period.

JAMES C. BRASWELL, M.D.

NOSE AND SINUSES

Goldman J. L. Moccasin Snake (Anastrodon Piscivorus) Venom Therapy for Recurrent Epistaxis. *Arch. Otolaryngol.* 1936 23 59.

The author reports the results of treatment with semi-weekly subcutaneous injections of a 1:3,000

solution of moccasin snake venom in cases of epistaxis due to telangiectasis, ulceration of the septum an invisible cause, or hemangioma. The dosage was begun with $\frac{1}{2}$ c cm and increased to a maximum of 1 c cm. No other treatment was administered while the snake venom was given.

Of thirteen cases of telangiectasis the bleeding was completely arrested in ten and greatly decreased in three.

Of fifteen cases of ulceration of the septum eleven were completely cured.

Of twelve cases of bleeding without visible cause the condition was completely cured in eight and the bleeding arrested in four.

Of two cases of hemangioma the lesion completely disappeared in one and became much smaller in the other.

In none of the cases was there any untoward reaction but in some of them the bleeding recurred.

JOHN F. DEER, M.D.

Enlow E. M. A. and Alexander S. A. Bacteriological Studies in Acute and in Chronic Maxillary Sinusitis. *Arch. Otolaryngol.* 1936, 23 665.

Bacteriological and microscopic studies were made of the exudates from the maxillary sinuses of 166 patients. Thirty-four of the cultures were of the clear albuminous type and the remainder were definitely purulent. *Streptococcus viridans* was isolated in pure culture from 75 (45 per cent) of the total number of exudates; *diplococcus pneumoniae* from 23 (14 per cent); *streptococcus pyogenes* of the hemolytic type from 14 (9 per cent); and *staphylococcus albus* of the hemolytic type from only 1. No obligate anaerobes were found.

JAMES C. BRASWELL, M.D.

NECK

Kamniker K. The Malignant Goiter (Ueber die Struma maligna). *Mitt. u. d. Grenzgeb. d. Med. u. Chir.* 1936 41 119.

At the Surgical Clinic of the University of Graz 1,608 cases of benign goiter and 80 cases of malignant goiter were treated in the period from 1924 to 1934. The incidence of malignant goiter was therefore 5 per cent. In females it was 3.5 per cent and in males 10.7 per cent. In females, the condition was most frequent in the sixth decade of life and in males in the seventh decade. A causal relationship of chronic irritation of a thyroid enlargement by the collar worn by men is suggested.

The author reports the cases of 3 patients who came to the Clinic for treatment of bone tumors which were found to be metastatic neoplasms of thyroid origin. Ten patients were admitted with the diagnosis of primary malignancy of the thyroid.

An important sign warranting the suspicion of secondary malignant degeneration of a benign goiter is sudden growth of the goiter. This occurs in from 60 to 80 per cent of cases. The time during which the rapid enlargement occurs varies from fourteen

days to a year and averages from two to three months. The author cites 2 cases.

As in cases of benign goiter, the most common symptom in cases of malignant goiter is difficulty in breathing. This occurs in 45 per cent of the cases. Kammiker reports 4 cases in which there were attacks of suffocation. In 3 of these the malignancy had proliferated into the trachea. In 36 cases the patient complained not only of respiratory difficulties, but also of disturbances in the gastro intestinal tract. The author reports a case in which the esophagus was compressed to the thickness of a thread. The treatment consisted of gastrostomy and roentgen irradiation. Difficulties in swallowing occurred in one third of the reviewed cases. Another important symptom of malignancy is pain which, in advanced cases, radiates usually toward the nape of the neck and the occiput and less frequently toward the ear, shoulder, and arm of the affected side. When this symptom is present, the prognosis is usually very poor. Involvement of the recurrent laryngeal nerve is of less significance as it is frequent also in benign goiter. It occurred in 13 of the cases reviewed. Cachexia occurred in 22.

Local metastases to the regional glands on the affected side were present in 22.5 per cent of the reviewed cases, and distant metastases in 21 per cent. The latter occurred in the lung in 11 cases, in the bones in 9 cases, and in the mediastinal glands and the pleura in 1 case each. The incidence of local and distant metastases considered together was 40 per cent. Metastases were found at autopsy in 17 cases (lungs, glands, vascular system, liver, pleura, bones, kidneys, adrenals, and spleen). Metastasis was more frequently hematogenous than lymphogenous. The sarcomas formed no bone metastases. The site of the tumor was on the right side in 45 cases and on the left side in 25.

Various methods of treatment are discussed: radical operation with or without postoperative roentgen irradiation, palliative operations (conservative resections and emergency procedures such as tracheotomy and gastrostomy) with or without postoperative irradiation, and roentgen irradiation alone. The most successful procedure for carcinoma as well as sarcoma is radical operation with postoperative roentgen irradiation. However, the

author cites 2 cases which showed remarkable improvement following irradiation therapy alone. Of 56 patients who were followed for at least three years, only 12 (21 per cent) lived longer than that length of time and, of the latter, only 4 were cured.

The author studied the records of the histological findings in 41 of the reviewed cases including 26 of carcinoma and 12 of sarcoma. The patients with sarcoma survived for from one to thirty five months. None of them lived longer than three years. One showed excellent improvement after roentgen treatment, but died at the end of thirty five months. The fact that the malignancy of sarcoma cells is considerably greater than that of carcinoma cells explains the considerably poorer results of treatment in cases of sarcoma as compared with cases of carcinoma. The author rejects the dictum of De Courcy that, in general, sarcoma should not be operated upon but should be treated by irradiation. In support of his opinion he cites excellent results obtained by operation plus irradiation.

First place in the treatment of malignant goiter belongs to operation. The most favorable time for the operation should not be missed by the use of irradiation. Except for inoperable cases, the author rejects treatment by irradiation alone.

The following 3 operations come up for consideration: (1) complete extirpation on one side and resection on the other, (2) total thyroidectomy, and (3) bilateral subtotal thyroidectomy.

In the reviewed cases the operative results were 88 per cent. Unfavorable results are attributable to 3 main factors: (1) thyroid gland, (2) the importance and parathyroid glands to the body, and (3) frequent impossibility of distinguishing tumor of the thyroid gland from a benign goiter. In the great majority of cases, the tumor develops from a benign goiter. There recommends that bilateral resection of the thyroid to its normal dimensions frequently than heretofore in cases of persistent thyroid enlargement after a year of age, and that an attention be given to the education of the public, to bring the patient to the physician or clinic in the early condition. (RINTELEN) WILLIS & C.

improvements. In contrast to the so called periarterial sympathectomies, operations on the sympathetic nerve and its ganglia and rami communicantes are well grounded physiologically because they enable the surgeon to improve the circulation of a definite portion of the body. Although it is often assumed that vascular paralysis results from such interventions, this never occurs even when all the sympathetic fibers supplying a given part are divided. The capacity of the periphery to react to external stimuli remains undisturbed because the network of the vascular nerves in the periphery possesses an extraordinarily high degree of independence and forms a kind of peripheral vasomotor regulation center. This fact explains why it is possible for recurrences to take place in spite of exclusion of the sympathetic.

The compilation of dependable statistics regarding the results of surgery of the sympathetic nervous system is difficult because reports on late results are much fewer than reports on immediate results. In migraine, the results of periarterial sympathectomy and of operations on the sympathetic nerve show a marked variation. In epilepsy parkinsonism glaucoma and trigeminal neuralgia those of operations on the sympathetic nerve are poor and in atypical neuralgia of the face they are variable. In Basedow's disease the treatment of choice has been and remains bilateral resection and ligation of the artery as complete exclusion of all of the nerve fibers controlling the secretion of the thyroid gland is impossible. Neither is it possible to correct a fixed exophthalmos by extirpation of the superior ganglion.

Well over 400 cases of asthma have been operated on by resection of the vagus or the sympathetic nerve or by bilateral combined resection of the vagus and the sympathetic nerves. In summary it can be said that operative treatment of bronchial asthma has not produced the results expected from it. Even resection of the posterior bronchial ramus of the vagus nerve by Braeuer's method has failed to prevent recurrence. Its failure is explained by the presence of autonomous ganglia in the bronchial wall which are excited by allergic or other stimuli in the blood.

To relieve the unbearable pain and the distressing state of anxiety in angina pectoris the attempt has been made to divide the sensory fibers running centrally from the heart and aorta. This is practically impossible as the pain conducting fibers for the heart come from the vagus, the cervical sympathetic, and the six thoracic ganglia. Division of the depressor has failed completely. In 50 per cent of cases of angina pectoris cessation of the attacks was obtained by total resection of the cervical sympathetic. In paroxysmal tachycardia the results of bilateral extirpation of the stellate ganglion are good. In cardio-spasm the condition was made worse by resection of the vagal fibers running to the cardia. Cardiospasm is usually not a spasm but a disturbance of the opening reflexes.

Reports of favorable results from resection of the sympathetic in megacolon have been increasing.

Of 40 cases in the literature, 34 were operated upon with success. Permanent cures from ramisection in spastic paralysis have not been reported.

In tabetic crises permanent cure cannot be expected from an operation on the sympathetic. In cases of pseudarthrosis Braeuer observed cures and Leriche unsuccessful results after sympathetic resection. In hyperhidrosis, vasomotor disturbances, and edema the results of sympathetic operations are good. In bone and joint tuberculosis no cures have been obtained by operation on the sympathetic. In chronic arthritis, but especially in recent traumatic arthritis indications for operation on the sympathetic appear to have been recognized very liberally. In the cases operated on by Rieder the results were unsuccessful. The reports on the results of operations on the sympathetic in causalgia, painful amputation stumps and ascending neuritis are contradictory. In 3 cases of neuroma and in cases of varicose ulcer of the leg which were operated upon by Rieder the pain recurred after temporary improvement. Variably better were Rieder's results from resection of the sympathetic in the severe dystrophy of the extremities described by Sudeck. Raynaud's disease, angitis obliterans and epicondylitis in these conditions the sympathetic should be attacked only after all conservative measures and the much simpler Hobmann operation have failed. In certain renal diseases resection of the sympathetic fibers running to the kidney may give a good result lasting for a number of years.

The author showed the conditions in his own patients before and after operation on the sympathetic by numerous photographs in color. He stated that, without doubt the result depends primarily upon the correctness of the indications. Lasting results can be obtained only when the noxae causing the spasms can be kept away permanently from the peripheral autonomic nerve plexuses and centers. Only strict indications, accurate anatomical knowledge and above all expert criticism can advance the surgery of the sympathetic nervous system.

In the discussion of this report, Haertel emphasized the great frequency of juvenile gangrene (endarteritis obliterans) in the Japanese. He and Japanese surgeons performed excision of the lumbar sympathetic for this condition in Japan as early as the 20's. Haertel has seen good results from this treatment in similar cases also in Germany. As to the technique he proposed reducing the amount of blood in the common iliac vein by ligation of the thigh clamping of the small badly bleeding veins with silver clips when the chain of glands lying in front of the sympathetic nerve are being removed and the use at operation, of Zeiss's binocular head magnifying glass which can be employed at a sufficient distance if a suitable convex lens with a wide focus is selected. Sometimes as for example, in spastic cramps, it is advisable to combine the excision of the sympathetic with Stoffel's operation on the cerebrospinal nerves carrying out the 2 procedures simultaneously.

LEHMANN reported the case of a man aged forty years who had had both thighs amputated by Roth for endangitis obliterans and suffered from extremely severe vascular cramps in the stump on the left side. For the relief of these cramps ramsection on the left side from the third lumbar to the second sacral was done. The vascular cramps and the pains ceased. However, within a few days after the operation, areas of at first transitory bluish discoloration (stasis) appeared in the skin of both thighs and later on the upper extremities and the trunk. At the beginning of the third week after the operation signs of a creeping peritonitis developed, and a few days later the patient died. Autopsy showed that the cause of the peritonitis was sharply circumscribed foci of stasis, about the size of a 10 pfennig piece, which were scattered over the wall of the small intestine. At these sites a penetration peritonitis had developed. Lehmann and his co-workers, as well as the pathologist, believe that the entire vasomotor apparatus had been disturbed by the operation on account of hypersensitivity of the patient.

Lehmann reported also the case of a forty five year-old man with endangitis obliterans and gangrene of the fourth and fifth toes of the left foot. On the day after the patient entered the clinic, venous thrombosis occurred in the left extremity and necessitated postponement of the intended removal of the lumbar sympathetic nerve for eight weeks. At the end of that time the operation proved to be technically impossible as the thrombosis had reached so high that it had distended the small collateral veins in front of, and beside, the spinal column to such an extent that access to the sympathetic was completely obstructed. Commenting on Usadel's remark that he (Usadel) found very superficial incisions to be sufficient for chordotomy, Lehmann stated that he does not employ Kirschner's puncture technique with a small knife marked for a 3 mm depth, but, like Heymann, uses a small, very sharply pointed, and slender instrument. He introduces this anteroposteriorly around the anterolateral column and through the medulla, and then makes the incision from the outside inward onto the instrument. This procedure allows him to make the incision to the exact depth desired and prevents extensive destruction.

KAPPIS recommended the induction of spinal anesthesia once or repeatedly in the treatment of nutritional disturbances of the lower extremities, as not only temporary, but sometimes permanent, improvement of the blood supply may thereby be obtained and any pain present may be relieved.

(RIEDER) FLORENCE A. CARPENTER

Coenen Y. Extirpation of the Stellate Ganglion in Acrocyanosis and Causalgia (Extirpation des Ganglion stellatum bei Acrocyanose und Causalgie). 60 Tag d. deutsch. Ges. f. Chir., Berlin, 1936.

Coenen reports the case of a twenty seven year-old woman in whom acrocyanosis of the hands and, to a lesser degree, of the feet, representing the stage

of local asphyxia of Raynaud's disease, developed in the course of six years. Paravertebral injection of novocain was followed immediately by a marked reddening of both hands which lasted for an hour and a half. On January 11, 1936, the left stellate ganglion was removed by Braeucker's procedure. Immediate reddening of both hands resulted. This phenomenon, an effect of the exclusion of the sympathetic nerves on the opposite side of the body, has often been mentioned in the literature and is readily understood when the sympathetic nervous system is interpreted, according to the conception of Stöhr, as a uniform syncytial plasmodium in which tonus variations can run off in all directions. After two days the right hand was cold and blue again, whereas the left hand remained red and warm. On February 15, 1936, extirpation of the right stellate ganglion was done, and since this intervention both hands have remained red and warm.

A similar case, that of a thirty six-year old woman, was reported by Rieder (*Arch. f. klin. Chir.*, 1929, 157 165). After removal of the inferior cervical ganglion and the first thoracic ganglion on the right side with a portion of the cervical sympathetic and the accessible periarterial fibers of the subclavian artery, the right hand was red and the left was blue. Six months later there was a recurrence. At autopsy after death from an intercurrent disease it was found that no sympathetic fibers running to the right arm remained. From this fact Rieder concluded that the autonomic plexuses of the vessels had returned to their pathological tonus. This explanation is illuminating, but applies only to cases in which the second thoracic ganglion has also been removed because this ganglion sends off a branch to the brachial plexus. Since, instead of excising the periarterial sympathetic nerves, surgeons have attacked the sympathetic ganglia or the rami communicantes, the results of surgery of the sympathetic system in Raynaud's disease have improved. Braeucker (*Arch. f. klin. Chir.*, 1931, 167 807) obtained good results in nine of eleven cases of Raynaud's disease, although in some of them suction treatment was required in addition. In two patients in whom the result was unsuccessful arteritis and thromboangitis were found. Rieder (*Beitr. z. klin. Chir.*, 1933, 157 208) reported six severe cases of Raynaud's disease, three of which were almost entirely cured. Gask and Ross (*Die Chirurgie des sympathischen Nervensystems*, 1936 Leipzig, Barth) cured twelve of fourteen cases of Raynaud's disease by ganglionectomy.

On August 7, 1914, a forty four year old man had his left hand crushed and on the following day was subjected to amputation of the arm below the elbow. Subsequently he was operated on nine times. Most of the operations were reamputations. Three times neuromas were removed. Ultimately, half of the arm was amputated. Since 1915 the patient had had very severe pain. He was very excitable, wept easily, and showed a tendency toward suicide. Following excision of the left stellate ganglion on January 10, 1936, the pains ceased immediately.

The effect of ganglionectomy in causalgia is still disputed. In Reschke's two cases (*Arch f klin Chir*, 1934, 180: 149) the pain recurred. Rieder never obtained successful results in stump neuralgia (*Chirurg*, 1936 p. 109). Braeucker (*Arch f klin Chir*, 1934, 180: 466) reported good results from ganglionectomy and the injection of carbolic acid into the peripheral nerves in six cases of this condition but unsuccessful results in others. In two cases of amputation causalgia reported by Coenen ganglionectomy failed to give relief. It is evident that in the cases in which the operation was unsuccessful the pain was in the ganglion cells in the spinal cord, central to the stellate ganglion.

In the discussion of this report USADEL cited favorable results from removal of the stellate ganglion and the sympathetic nerve with the lumbar and sacral ganglia. However, like Rieder and others, he emphasized that this operation cannot be expected to be successful in every case. He shares the view of Coenen that in cases in which numerous interventions for the removal of neuromas and operations on the sympathetic have not resulted in complete freedom from pain there is still the possibility of obtaining good results from bilateral division of the path of the anterior lateral column chordotomy. Sympathetic stimuli reach the higher centers by way of spinal paths. Usadel obtained complete freedom from pain in several cases by means of chordotomy. He stated that he believed that surgeons often hesitate to perform chordotomy because of the fear of motor paralysis. This fear is groundless at least when the chordotomy is to be performed for causalgia of stumps of the leg or thigh. In this condition the division of the paths of both anterior lateral columns should be undertaken at the level of the third or fourth thoracic segment. At this level the somatotopical segmental formation of the anterior lateral column is such that the fibers originating in the caudal segments of the cord are located most exteriorly. Therefore it is unnecessary to make the incision deep in the bundle of the anterior lateral column and injury to the motor paths may be avoided. In his most recent chordotomies Usadel made a very superficial incision only from 1 to 1.5 mm deep directly in front of the attachment of a

finger of the ligamentum denticulatum. He obtained complete freedom from pain in the stumps with preservation of the other senses of feeling and without the slightest limitation of motility.

ROEFÆ reported a case in which amputation of the left thigh was performed for gangrene from end arteritis obliterans. The end of the stump again disintegrated and severe pains which could not be relieved by internal treatment were constant. After extirpation of the lumbar sympathetic nerve with its ganglia at the level of the fourth and fifth lumbar segments, the pains ceased promptly and permanently and the disintegration of the stump was arrested.

FLORECE A. CARPENTER

Leriche R., and Fontaine R. General Results of 1,256 Sympathectomies (Résultats généraux de 1 256 sympathectomies) *Mém Acad de chir* Par 1930, 62: 877

On the basis of 1,256 operations which they have performed on the sympathetic nervous system in the last thirty years the authors present their views on the seriousness of surgery of the sympathetic nervous system and the indications for such surgery. They state that the operative mortality in their cases was insignificant, but in a number of conditions such as the presence of old infected ulcers or localized gangrene, caution is necessary.

Good results are claimed for sympathectomies in facial paralysis, angina pectoris, traumatic diabetes insipidus, Raynaud's disease, post-traumatic painful osteoporosis, hyperhidrosis, retinitis pigmentosa, chronic leg ulcers, and the various forms of arterial tree involvement for which central sympathectomy or arterial resections may be done. Less favorable results are obtained in pulmonary tuberculosis, trigeminal neuralgia, Basedow's disease, chronic hypertension, and tabetic arthropathies. The most satisfactory end results have been obtained in vasomotor and trophic disturbances.

The authors use arteriography as frequently as possible, having found it to be an important diagnostic aid. They regard sympathectomy in its various forms as a physiological and functional form of therapy which acts through the vascular tree rather than through the nervous system. JOHN MARTIN, M.D.

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CHEST WALL AND BREAST

Staff of the Roscoe B. Jackson Memorial Laboratory
The Constitutional Factor in the Incidence of Mammary Tumors *Am J Cancer*, 1936, 27 551

The authors state that in a mammal which has long been subjected to intensive and extensive laboratory investigations, constitutional factors are normally of prime importance in determining whether or not a mammary tumor will be formed. They may play an important part also in determining the general type of the mammary tumor. These conclusions are based on the following experiments carried out on mice.

For the first experiment fifty females of the dilute brown, high tumor strain were selected. At ten days of age the five mammae on one side of the body were sealed by cauterization with a hot needle. Those on the other side of the body were untouched. The mice were raised, bred, and allowed to suckle their young on the unsealed side. Forty of the animals developed tumors. Of these, twenty-two (55 per cent) had tumors on the side with sealed mamma, fifteen (37.5 per cent) had tumors on both sides, and three (7.5 per cent) had tumors on the untreated side only. Not only was the incidence of tumors significantly higher on the side on which drainage was blocked, but the tumors occurring only on the blocked side appeared on an average seventy-five days earlier than the others.

For the second experiment sixty females of a low tumor strain were selected. These were similarly treated. None developed a mammary tumor. In the authors' opinion this fact shows that the constitution of these low tumor mice was able to counteract completely the effect of a type of internal irritation which strikingly influenced the location and time of appearance of tumors in a strain of different genetic constitution.

The authors conclude also that the results of their experiments show that internal secretions working through the function of the ovary and mammary tissue are factors which may influence the expression of the constitutional tendency toward the formation of mammary tumors.

From experiments previously reported they conclude that there are constitutional factors which contribute very definitely to the incidence of mammary tumors in mice, and that some of these at least are passed from one generation to another more successfully by the female than by the male. Experiments are now in progress to eliminate or evaluate the milk obtained by the nursing young and the fetal circulation as possible bearers of an agent or agents.

EARL O. LATIMER, M.D.

Fekete, E., and Green, C. V. The Influence of Complete Blockage of the Nipple on the Incidence and Location of Spontaneous Mammary Tumors in Mice. *Am J Cancer*, 1936, 27 513

The authors state that it is generally admitted that constitutional factors predispose to the development of neoplastic growths. A genetic complex permitting the development of a tumor, whether or not the potentiality becomes an actuality, is known to be influenced by non-genetic or, in a wide sense of the word, environmental factors. One of the most important of the latter is believed to be chronic irritation.

To determine the effects of occlusion of the mammary ducts with resulting stagnation of milk on the development of carcinoma, the authors carried out the following experiment on female mice of a high tumor and a low tumor strain. The mice of the high tumor strain belonged to the inbred Little Murray dilute brown strain, in which over 80 per cent of the females with a normal reproductive history develop carcinoma of the breast.

When the animals were ten days old, the five nipples on the right side were touched with a fine red hot wire, the ducts being thus effectively sealed. When the animals were about a month old, they were mated and allowed to breed in the same manner as mice in the regular breeding colony. The left side served as a control for the treated right side. At various times the breasts were excised and examined under a dissecting microscope. In 55 per cent of the mice of the high tumor strain cancer developed only on the blocked side, in 7.5 per cent, only on the control side, and in 37.5 per cent on both sides.

From the results the authors conclude that blockage of the mammary ducts with resulting milk stagnation is influential in determining the site and the time at which mammary tumors appear in a genetically susceptible strain, but does not in itself cause tumors since in animals of a strain in which ordinary tumors do not develop it is unable to overcome the hereditary resistance. JOHN H. GARLOCK, M.D.

Suntzeff, V., Burns, E. L., Moskop, M., and Loeb, L. The Effect of Injections of Estrin on the Incidence of Mammary Cancer in Various Strains of Mice. *Am J Cancer*, 1936, 27 229

It is possible to increase the incidence of mammary cancer in mice by long continued injections of estrin. The effect varies directly with the size of the dose and the hereditary tendency of the given strain to develop cancer. In high tumor strains of mice, large doses of estrin administered over long periods of time lower the age at which cancer appears below that at which tumors occur spontaneously. In such

strains the incidence of cancer is increased and the tumor age is lowered because of the great responsiveness of the mammary gland to prolonged stimulation with estrin. In mice not belonging to high tumor strains the tumor rate is raised to a lesser extent and the tumor age is lowered to a slighter degree by prolonged injections of estrin. In high tumor strains the administration of estrin causes cancer of the mammary gland as readily in males as in non-breeding females. However, even in breeding mice of high tumor strains injections of estrin in the moderate quantities used in the authors' experiments and for interrupted periods did not lead to a definite increase in the incidence of mammary cancer over that in breeding controls. Neither did ligation of the nipples on one or both sides have a definite effect on the cancer rate.

The two methods by which it has been possible to prove the etiological importance of internal secretions in the origin of cancer, namely decreasing and increasing the action of ovarian hormones have led to concordant results. By decreasing the action of ovarian hormones it has been shown that the development of spontaneous mammary carcinoma in mice is due to the action of those hormones on mammary tissue which is made especially responsive to such stimulation by hereditary factors. The greater the amount of hormone which is allowed to act the greater the effect. By the same method it has been proved also that the greater the hereditary responsiveness of the tissue the greater the number of tumors which develop and the earlier they appear. By increasing the action of ovarian hormones through the administration of an excess of the ovarian hormone estrin it is possible to increase the number of cancers over the number occurring spontaneously in non-breeding mice. It has been shown also that the mammary gland of male mice is hereditarily at least as predisposed to the development of carcinoma as the mammary gland of female mice.

JOSEPH K. NARAY, M.D.

Bagg, H. J. Further Studies on the Relation of Functional Activity to Mammary Carcinoma in Mice. *Am. J. Cancer* 1936 27 542

In experiments with mice of a low tumor strain the female mice were bred at as early an age as possible. The offspring were removed as soon after birth as they were discovered which was usually within a few hours. The mothers were returned to the breeding pens at once. Since estrus closely follows parturition the females frequently became pregnant within a short time. This procedure was continued indefinitely. A high protein diet was required to keep the animals breeding actively.

About 6.5 per cent of F_1 females, whose mothers were from low tumor strains showed evidence of mammary tumors when they were bred rapidly and not allowed to nurse their young. Observation up to ten years revealed no mammary tumors in the strains from which these experimental animals originated.

The author concludes that the functional activity of the mammary gland is related to the production of spontaneous mammary gland tumors in certain strains of mice. Apparently internal factors of a hormonal nature (probably ovarian in this case) and possibly the chemical irritation of retained mammary gland secretion bear a causative relation to the onset of mammary carcinoma. Rapid breeding and non-suckling (the so-called functional test of the reported experiments) have aided in detecting in distinctly low tumor strains, the presence of individuals whose constitution is favorable to the growth of mammary gland tumors. Conversely, failure to produce such tumors after a severe functional test may indicate the presence of individuals whose constitutions are unfavorable to the growth of mammary gland tumors.

EARL O. LATIMER, M.D.

Lacassagne, A. Hormonal Pathogenesis of Adenocarcinoma of the Breast. *Am. J. Cancer*, 1936 27 217

It is quite easy to imagine two mechanisms enabling one cell of an organism to liberate itself from subordination to the whole: (1) the loss of something rendering the cell unable to obey the regulatory inhibitions, and (2) the acquisition of something acting as a permanent stimulant. The author has therefore undertaken a study of agents capable of modifying cellular division in the organism, the origin of which can be recognized as exogenous or endogenous. In this article he limits his discussion to one of the endogenous factors, namely, estrone, the substance considered to be the female sex hormone.

The intervention of estrone excites a cellular division specifically in certain types of epithelium. Physiologically this stimulation is transient. There seems to be general agreement that under the prolonged influence of estrone the cells of a tissue sensitive to its action may undergo a special and indeterminate activation which transforms them into cancerous cells. That this change may be favored by a hereditary predisposition to cancer is indicated by the provoking of adenocarcinoma in the breasts of male mice. The author reports the results of experiments on litters of mice in which massive weekly injections of estrone benzoate were begun immediately or several days after the birth of the animals and continued indefinitely. In experiments on mice of a strain in which about 72 per cent of the females habitually succumb to adenocarcinoma of the breast he found foci of cancerous degeneration in the breasts of all of the males between the fourth and tenth month. In experiments on a strain of mice in which only 2 per cent of the females develop spontaneous adenocarcinoma none of the surviving animals presented tumors at the end of the period in which almost all of the mice of the strain previously studied had died of adenocarcinoma of the breast. In the ninth month however the appearance of a cancer was observed and in the course of the following months others appeared until between the twelfth

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and eighteenth months, all of the mice of this strain died of malignant tumors of the breast although the lesions appeared much later than in the other strain. Therefore, in the animals of this strain the cancerous transformation of the cell apparently required a longer time.

If adenocarcinoma of the breast is regarded as the consequence of a special hereditary sensitivity to the proliferative action of estrone, one is led to imagine a preventive treatment for persons predisposed to such a cancer by their heredity. This would consist in the suitable use of a hormone, antagonistic or excretory, to prevent the stagnation of estrone in the ducts of the breasts. Many other cancers, among the most frequent, seem also to have their origin in glandular ducts subject to retention (sebaceous, sudorific, uterine, prostatic, pharyngeal, and other glands). If the retained products contain a sexual hormone or an organic and chemically related substance, it is possible to envisage a like pathogenic mechanism and foresee the possibility of analogous attempts at prophylaxis. JOSEPH K. NARAT, M.D.

Smith, E. G. Sterilization In Carcinoma of the Breast. *Am J Roentgenol*, 1936, 36: 65.

It is well known that there is a definite relationship between the activity of the ovaries and the histology and physiology of the breast. There is evidence for the belief that in certain cases of carcinoma of the breast in young women marked improvement results when ovarian stimulation is eliminated by sterilizing doses of roentgen rays. This improvement may be manifested by the disappearance of metastatic nodules in the skin, shrinkage of glands showing metastatic involvement, improvement in the blood picture, a change of the osteolytic type of bone lesion to the osteosclerotic type, alleviation of the pain, and a subjective feeling of general good health.

While there is no evidence for the belief that sterilization prolongs the duration of life of young women with breast carcinoma, the condition terminates after this treatment in a relatively sudden decline instead of a steady painful decline. For these reasons it seems to the author that all women with carcinoma of the breast who have not reached the menopause should receive ovarian irradiation.

GEORGE V. COLLITT, M.D.

TRACHEA, LUNGS, AND PLEURA

Gerling, P. G. Bronchoscopy In Hemoptysis. *J Laryngol & Otol*, 1936, 51: 508.

In many cases of hemoptysis a correct diagnosis can be established with certainty by physical, roentgenological, or bacteriological methods. In cases in which these methods fail to reveal the cause of the bleeding bronchoscopy is indicated. The use of the bronchoscope is frequently of value also for local treatment of the lesion.

The author reports several cases showing the value of bronchoscopy in the diagnosis and treat-

roentgenological study as the clinical symptoms are not characteristic and do not definitely indicate the degree of involvement. In the early stage the symptoms are those of ordinary 'catarrh' of the respiratory tract—a slight chronic cough with the expectoration of mucus. The general health is not affected. Dyspnea does not develop until the lesions are well advanced. The symptoms of extensive lesions are frequently slight. It is only when the lungs have been largely converted into a fibrous mass that cardiopulmonary symptoms develop. In its terminal phase silicosis presents the picture of cardiac insufficiency.

While the stages of silicosis are not clearly defined clinically three stages or degrees are distinguished on the basis of the roentgen findings. The first stage is characterized by intensification of the gland and bronchovascular shadows of the pulmonary hilus the second by the appearance of numerous nodules extending from the region of the hilus toward the center of the lung and the third by dense masses due to the progress of the sclerosis, localized chiefly in the central region of the lungs, and sometimes by involvement of the pleura with the formation of pleural adhesions.

Of the author's fourteen cases seven showed the first stage four the second and three the third. In one case there was an associated spontaneous pneumothorax. Except in the latter the severity of the dyspnea was by no means proportionate to the extent of the pulmonary lesions. The sputum was moderate in amount and of the catarrhal (mucous) type.

In one of the cases with third stage lesions autopsy was performed and a histological study of the lungs was made. In the areas showing the least fibrosis the alveoli were relatively permeable. Numerous mineral particles were present within these alveoli and in their walls. In the interalveolar spaces there was a beginning fibrosis localized chiefly around the bronchi and blood vessels. Here also were numerous mineral particles. In the zones where the sclerosis was dense the mineral particles were found only rarely or not at all. Silicon could be demonstrated chemically in this tissue.

From the findings in this case and those reported by others Eizaguirre concludes that for the development of a pulmonary fibrosis dust particles must reach the alveoli. Some of them may be retained there but others are carried by phagocyte cells into the lymphatics. Wherever they accumulate they cause a reaction of the fibrotic type. The fibrosis increases as the accumulation of the dust particles and the resulting lymphatic stasis increase. The action of silicon in producing the fibrotic tissue reaction is due to the fact that the silicon is rendered soluble in the protoplasm of the phagocytic cells. The more silicon is thus rendered soluble in the tissues, the more intense is the reaction and the greater the toxic effect. Workers exposed to silica dusts do not show symptoms for some time, but after the symptoms develop they persist for months

or even years, following termination of the exposure. This is due to the fact that the process of absorption and fibrotic reaction is gradual. ALICE M. MEYERS

Mauer and Dreyfus: Le Foyer Technique of Subperiosteal and Extraperiosteal Paravertebral Thoracoplasties (Technique des thoracoplasties paravertébrales sous et extra-périostées). *J. de chir.* 1936 47 721

The authors believe that the technique used for thoracoplasty by Sauerbruch and by Archibald can not be varied sufficiently to meet all requirements. They have therefore worked out a technique which is more adaptable.

The patient lies on his normal side with folded sheets under his face, neck, and upper ribs so that his shoulders alone rest lightly on the table. Another folded sheet is laid longitudinally under the lower part of the thorax so that the tip of the scapula is brought as far upward, forward, and outward as possible. The field is disinfected with iodine. Local anesthesia is used for the skin and regional anesthesia for the chief nerve trunks. The anesthetic is a 1:200 solution of novocain.

The incision is begun midway between the inner border of the scapula and the line of the spinous processes, its upper end being at a horizontal line passing through the spine of the scapula. It first extends vertically downward, then curves outward and ends 2 fingerbreadths below the tip of the scapula and 1 fingerbreadth outside a vertical line passing through the lower angle of that bone.

The steps of the operation are described in detail and illustrated. The first three ribs are resected. The posterior arches may be sectioned at the tips of the transverse processes or the latter may be resected and the ribs disarticulated. At first the authors did only a subperiosteal resection, incising the periosteum longitudinally and carefully pushing it aside before resecting the bone. However they found that when the lower ribs were to be removed by a second and third operation the upper ribs sometimes re-ossified and therefore the cavity was never completely collapsed, particularly if the later operations were delayed on account of the patient's condition. Accordingly, they now do an extraperiosteal resection with apicolysis. They believe that this technique increases the possibility of surgical treatment of pulmonary tuberculosis. Because of the better collapse of the dome of the pleura, it renders less extensive operations sufficient in stabilized cases. Moreover it makes it possible, in certain progressive cases, to operate and then delay the other steps of the operation, without fear of ossification, until the patient has recovered.

In the second stage, the fourth, fifth, sixth and sometimes the seventh ribs may be resected after an interval of three or four weeks or even longer through the same incision. If necessary, the eighth to tenth or eleventh ribs may be resected through a second incision curved downward from the first one, convex outward and extending to below the tenth or

eleventh rib. The number of ribs to be removed and the extent of the resection depend upon the site and nature of the lesion. Extraperiosteal resection should not be performed below the fifth or sixth rib as it is inadvisable to leave a mobile floating thoracic wall not protected by the scapula.

If the intercostal muscles are to be resected, care must be taken to avoid sectioning or removing the six or seven last intercostal nerves which supply the muscles of the wall of the abdomen as this might result in dangerous paralysis of the abdominal wall.

ANDREW GOSS MORGAN, M.D.

Kramer, R., and Son, M. L. Bronchoscopic Study of Carcinoma of the Lung. An Analysis of 300 Cases of Bronchial Carcinoma with 100 Post-mortem Examinations. *Arch Otolaryngol*, 1936 73 536

Of the patients whose cases are reviewed by the authors, 66 per cent were in the fourth or fifth decade of life. The youngest was nineteen years and the oldest seventy six years. The ratio of males to females was 3:1. In 48 per cent of the cases in which autopsy was performed the lesion was found in an upper lobe of the lung. The right upper lobe was involved nearly twice as frequently as the left upper lobe.

The authors state that although they use the term "carcinoma of the bronchus" and "carcinoma of the lung" freely, these terms are not strictly interchangeable. From 80 to 90 per cent of pulmonary carcinomas are truly of bronchial origin and it has not yet been definitely disproved that from 10 to 20 per cent do not arise in pulmonary alveoli.

The authors accept the topographic classification of pulmonary carcinomas suggested by Wessler and Robin. According to this classification, 62 per cent of the neoplasms arise from a large bronchus or the hilus, 18 per cent from a small bronchus, and 20 per cent from the parenchyma.

Carcinomas of a large bronchus, including tumors located in bronchi of the first, second, and third order, constitute the majority of all bronchiogenic carcinomas. Their origin is usually somewhere along the bronchial mucosa. From this point they proceed both by direct extension and through the lymphatic system. Carcinomatous stenosis of a bronchus may be due to an obliterating stenosis, infiltrating stenosis, or extrabronchial pressure such as that produced by enlarged lymph nodes. Carcinomatous ulceration in some degree is present in most bronchial stenoses.

Carcinomas of small branch bronchi are located in bronchi of the fourth to the ninth order and constitute from 15 to 20 per cent of all pulmonary carcinomas. Clinically and pathologically there are 2 types which occur with about equal frequency. The peripheral localized form spreads slowly toward the periphery. The peripheral infiltrative type is much more malignant, metastasizes early to regional lymph nodes, and infiltrates along the lymphatic vessels toward the hilus.

Parenchymal carcinomas include the peripheral localized, almost circumscribed neoplasms which probably originate in the pulmonary alveoli. Post-mortem specimens show that even the most minute grossly visible bronchi are free from tumor infiltration. These tumors metastasize relatively late.

All bronchiogenic carcinomas are infiltrative and sessile. In the authors' series of 300 cases there was none in which a true carcinoma presented a pedunculated appearance. The authors believe that pedunculated bronchial tumors are adenomas with a non malignant course.

The bronchoscopic appearance of bronchiogenic carcinomas of the various types and location is described by them in detail.

Of 200 cases of pulmonary carcinoma proved clinically, but in which no postmortem examination was made, 152 (76 per cent) were proved by histologic examination of a bronchoscopically removed specimen. In 48 (24 per cent) a bronchial biopsy specimen showing tumor growth was unobtainable. In 17 of these 48 cases the diagnosis was established by biopsy of axillary or cervical nodes, in 7, by the demonstration of tumor cells in fluid removed from the chest (Mandelbaum's technique), in 2, by examination of material taken by punch biopsy, and in 22 by clinical and roentgenographic evidence.

Among associated findings in the 200 cases in which a postmortem examination was made were infiltration of the esophageal wall in 8 cases and tuberculosis of the lung in 4. Syphilis was demonstrated by serological tests in 4 cases, but in no case was there evidence of syphilis of the lung. Secondary pulmonary abscesses were found in 14 cases.

Paralysis of the phrenic nerve occurred in 9 cases—in 6 on the left side and in 3 on the right. Paralysis of the recurrent laryngeal nerve occurred in 24 cases. In 8 it occurred on the left side, in 5 cases, on the right side and in 1 case on both sides.

Pleural effusion could be demonstrated either clinically or roentgenographically in 27 cases. In 16 tumor cells were demonstrated in the fluid, in 11 the fluid did not contain tumor cells. The authors therefore conclude that, in the presence of a pleural effusion, a positive diagnosis can be made more frequently by microscopic examination of a specimen removed with the bronchoscope than by examination of the pleural fluid.

IRLE O. LATIMER, M.D.

HEART AND PERICARDIUM

McDonald, S., Jr. Primary Endothelioma of the Pericardium. *J. Path. & Bacteriol.*, 1936, 43 137

The author reports a case of primary endothelioma of the pericardium in a male laborer fifty three years old. The man collapsed while at work and died in a few minutes.

McDonald states that in the absence of reliable differential criteria the diagnosis of endothelioma of the pericardium must be determined largely by ex-

clusion In a review of the literature he found the records of six apparently authentic cases

The differential diagnosis appears to lie between endothelioma and sarcoma Later has reported about fifteen cases of pericardial sarcoma The following factors appear to be more characteristic of endothelioma than sarcoma (1) a relatively slow rate of growth (2) extension by direct invasion and by way of the lymphatic channels (3) absence of metastasis by the blood stream (4) a fascicular and to some extent perivascular arrangement of the cells and (5) an intimate relationship of the cells to a well formed collagenous stroma However the characteristics of cells may be modified by pressure and stroma reaction particularly in tumors infiltrating solid organs GEORGE A. COLETT M.D.

ESOPHAGUS AND MEDIASTINUM

Kuess G Cardio Esophageal Strictures (A propos des rétrécissements cardio-œsophagiens) *Médecine Acad de chir* Par 1936 62 838

Kuess reports a case of typical cardiospasm in a woman twenty years of age Operation was performed by the abdominal route No mechanical cause of the obstruction was apparent The operation consisted of incision of the wall of the cardia down to the mucosa Relief of the symptoms was only temporary and the patient was later operated upon by Desplas Desplas reported that at the second operation he found a fibrous ring about the cardia extending vertically a distance of 4 cm He sectioned the wall down to the mucosa as Kuess had done When seen a month later the patient was free from symptoms ALBERT F. DEGROAT M.D.

Courty, P. L. Acute Emphysema of the Mediastinum Following Injuries to the Thorax (L'emphyse aiguë du médiastin consécutif aux traumatismes du thorax) *Rev de chir* 1936 55 299

Courty states that parietal or subcutaneous emphysema is not an unusual complication of fracture of the ribs whereas emphysema of the mediastinum is a rare and very serious complication of thoracic injuries The latter may occur also after injuries to the larynx and trachea

In a case observed by the author acute emphysema of the mediastinum followed the fracture of several ribs When the patient was first seen he was in a state of shock and there was some subcutaneous emphysema on the right side Under treatment his condition improved and the dyspnea that had been present disappeared However on the night of the fourth day his condition became suddenly worse, dyspnea became severe cyanosis developed rapidly with signs of cardiac failure and a large collection of air was found in the region above the clavicles and below the hyoid Three cervical incisions were made and the cellular fatty tissue separated with the finger until bubbles of air escaped The incisions were left open for a time with a drain inserted in each The patient made a good recovery

Two cases are cited from the literature, one reported by Gatellier in 1914 in which mediastinal emphysema followed a penetrating war wound of the thorax and one reported by Rieder in 1931 in which this condition resulted from a fracture of the trachea

The characteristic sign of mediastinal emphysema is a swelling with gaseous crepitation in the region above the sternum and the clavicles which may extend upward to the face and head (as in the author's case) or outward toward the shoulders Usually this develops suddenly and is accompanied by severe dyspnea, rapidly developing cyanosis and distention of the veins of the neck The pulse becomes small and weak Death may occur before treatment can be given, but in the less rapidly developing cases treatment may give relief

Gatellier has pointed out that in injuries of the thorax it is possible to determine whether mediastinal emphysema is developing before its characteristic symptoms appear The signs and symptoms of the condition in its earliest stages are pain in the diaphragm due to pressure on the phrenic nerve by the air filling the mediastinum disappearance of the precordial area of dullness and a feeling of tension on palpation above the sternum Fluoroscopic examination shows the mediastinum to be less opaque than normal

Various methods of surgical treatment have been used for the relief of mediastinal emphysema The method employed by the author in the case reported has been used also by other surgeons In this procedure three low cervical incisions are made a vertical incision above the sternum (as proposed by Lejars), and two horizontal incisions above and parallel with the clavicles In each incision the cellular fatty tissue is opened up to drain the mediastinum The anterior mediastinum is drained through the vertical incision and the posterior mediastinum through the two supraclavicular incisions If this does not give the patient sufficient relief, the cellular cavities of the neck may be opened by the method described by Gatellier In some cases the pleurotomy operation described by Chavannaz may be necessary ALICE M. MEYERS.

MISCELLANEOUS

Eversole U H and Overholt R H Anesthesia in Thoracic Surgery *J Thoracic Surg* 1936, 5 510

Anesthesia for thoracic surgery presents several unusual problems The anesthetist must not only induce anesthesia, but also provide an adequate amount of oxygen keep the tracheobronchial tree aspirated, and control the intrapulmonic pressure The patient is usually in a poor physical state because of a protracted illness confinement to bed, and septic absorption from the site of pulmonary disease Such an individual is intolerant to even slight degrees of anoxemia As the pathological process is located within the organ of respiration certain mechanical and physical problems must be considered The absorptive surface of the lung is reduced, and

this reduction affects the absorption of both the anesthetic agent and oxygen. Obstruction of the air passages by mucus and pathological secretions occurs. The cough reflex is overactive and may interfere with the smoothness of induction of the anesthesia. The position of the patient on the operating table with the healthy lung in a dependent position favors the spill of pathological secretions into the normal lung. It tends also to immobilize the chest and diaphragm on the healthy side and thereby further limit the lung volume. Open pneumothorax is another problem. Respiratory and circulatory embarrassment may be produced by opening of the pleural cavity. The greatest difficulties arise when the visceral pleura is free, the mediastinum mobile, and the opening in the pleural cavity small so that more air enters the pleural cavity than leaves with each respiratory cycle.

Closed anesthesia, preliminary artificial pneumothorax when the pleura is free, and the use of high concentrations of oxygen during the period of time the chest is opened tend to lessen the danger of open thoracotomy. Postoperative complications due to internal drainage of the diseased lung with inhibition of the cough reflex is favored by the prolonged action of drugs used for preliminary narcosis. Therefore these drugs should be avoided.

The ideal anesthesia for thoracic operations requires an anesthetic agent which will not exert a deleterious effect upon the patient and is rapid in action and pleasant to take. The respiratory movements must be quiet but of sufficient amplitude to fill the alveoli. The amount of the anesthetic agent administered should be under control so that it may be increased or decreased at will. The action of the anesthetic should cease when the administration is discontinued in order that consciousness and the cough reflex may be restored rapidly. Facilities for the aspiration of material from the lungs should be available at all times, and intrapulmonic pressure should be under the control of the anesthetist.

The drug most commonly employed to produce general anesthesia without inhalation is tribromoethanol (avertin). This is usually unsatisfactory for thoracic surgery because its use is frequently followed by a postoperative lowering of the blood pressure and by depression of the respiration and the cough reflex associated with a variable degree of cyanosis.

Nitrous oxide is also used extensively, but its administration is associated with struggling on the table, deep forceful respirations, cyanosis, and a rising pulse. Moreover, it requires a 90 per cent concentration of the gas which permits the use of only a 10 per cent concentration of oxygen. This amount

of oxygen is usually not enough for an individual with a limited absorptive surface. Ethylene allows the use of an oxygen concentration of from 15 to 20 per cent, but even this is not enough to prevent anoxemia. Ether permits adequate oxygen administration, but is irritating to the mucous membranes and increases bronchial secretion. Acetylene permits the use of a higher concentration of oxygen, but is highly explosive and requires a cumbersome apparatus for its administration.

At the Lahey Clinic, cyclopropane has been found the anesthetic of choice and during the last two and one half years has displaced practically all other anesthetic agents for thoracic work. Cyclopropane is trimethanol, a compressible hydrocarbon gas with the empirical formula C_3H_6 . It may be administered by the ordinary gas machine. It is a powerful anesthetic producing in a concentration of 20 per cent or less a depth of anesthesia approaching that obtained with ether. Therefore an oxygen concentration of 80 per cent or more may be administered and many of the difficulties arising with the use of other anesthetic agents, such as anoxemia, cyanosis, carbon dioxide accumulation, struggling respiratory movements, and a rising pulse, are avoided. Recovery from the effects of cyclopropane is rapid, consciousness being regained usually in from three to ten minutes. The cough reflex returns with equal rapidity. Nausea and vomiting occur in about one fourth of the patients in the first three minutes, but only one-tenth of the patients have subsequent nausea. As cyclopropane is not a respiratory stimulant, the preoperative dose of an opium derivative is much smaller. By using a closed system of anesthesia with provision for the absorption of carbon dioxide the anesthetist may control the administration of the gas and the intrapulmonic pressure. The danger of explosion is avoided by preventing escape of the gas into the operating room. If spontaneous respiration is rendered impossible by accidental opening of both pleural cavities, rhythmic manual pressure on the rubber breathing bag containing the anesthetic mixture will establish artificial respiration with a pressure of 7 or 8 mm Hg and in this manner lung collapse may be prevented. Aspiration of mucus, blood, or secretions from the trachea may be accomplished by the use of a No. 16 F catheter attached to a suction apparatus. In cases of bronchiectasis and lung abscess operated on at the Lahey Clinic an indwelling tracheal catheter is employed routinely. The catheter is used also in cases in which bronchial obstruction may occur during the operation. However, in the average case of thoracoplasty it has not been found necessary.

MANUEL E. LICHTENSTEIN, M.D.

SURGERY OF THE ABDOMEN

GASTRO-INTESTINAL TRACT

Flusterer H The Clinical Characteristics and Treatment of Cancer of the Digestive Tract (Zur Klinik und Therapie des Carcinoms des Verdauungstraktes) *Han med Hknschr* 1935 2 1273 1305 1335 1359 1420 1433 1936 1 39 95 182

On the basis of 1 122 cases of carcinoma and 15 of sarcoma of the gastro intestinal tract which he and his associates operated upon during the past twenty five years the author discusses what we are able to do today in the battle against these diseases. He states that the treatment indicated is the earliest and most radical removal of the lesion possible.

1 Carcinoma of the upper part of the esophagus. Although cancers of the tongue oral cavity and pharynx can be recognized in an early stage because they are not only visible but also directly palpable the incidence of permanent cure of these lesions is only about 15 per cent. Irradiation therapy gives more lasting results than operation. Cancer of the cervical portion of the esophagus may be operated on successfully. The operative mortality is about 27.5 per cent. Cancers of the thoracic and abdominal portions of the esophagus have an especially unfavorable prognosis.

2 Cancer of the stomach. This is the most frequent cancer in the digestive tract. As early diagnosis is of the greatest importance, the public must be enlightened regarding its manifestations. In the early recognition of the condition x ray examination especially the modern demonstration of the mucosal relief, is of great aid. For doubtful cases the author advises exploratory laparotomy. He regards as inoperable only those cases in which distant metastases are demonstrated definitely. He states that a large palpable tumor advanced age, severe cardiac or pulmonary disease secondary anemia, and advanced cachexia do not contra indicate operation. He disapproves of the 2 stage resection. In the cases of patients in very poor condition he prefers to precede the resection by jejunotomy. He estimates the operative mortality at less than 10 per cent. Because of the use of local anesthesia the mortality due to pneumonia in his cases has been only 1 per cent. In cases of inoperable cancer of the stomach with stenosis he performs an anterior gastro enterostomy with entero anastomosis. He is extremely radical in his resections removing nearly all of the stomach and the entire great omentum. The incidence of permanent cure in his cases is between 22.2 and 27.6 per cent. It is lower in cases of ulcer carcinoma than in those of primary carcinoma.

3 Sarcoma of the stomach. Sarcomas of the stomach are relatively rare constituting only 1.7

per cent of all tumors of the stomach. While the 8 cases reviewed are too few to warrant definite conclusions relative to permanent cure, the author believes that the prognosis is not so unfavorable as is usually assumed.

4 Cancer of the pancreas. Finsterer discusses this condition only very briefly as radical operation is practically impossible. As the disease is usually accompanied by icterus an exploratory laparotomy is indicated to prevent an erroneous diagnosis (obstruction by stone).

5 Carcinoma of the biliary passages. This condition, which is not frequent, is very serious as permanent cures are extremely rare. Of 52 operations for cancer of the gall bladder, the author found gall stones in nearly all. In 3 cases extensive resection of the liver was necessary. All 3 patients survived the operation but only 1 was permanently cured. It is important to prevent the development of carcinoma of the biliary passages by early removal of the chronically inflamed and stone containing gall bladder. Cancer of the bile ducts is even rarer than cancer of the gall bladder. Primary cancer of the liver is hardly a surgical condition.

6 Tumors of the small intestine. Carcinoma of the small intestine is very rare. Moreover, the malignant degeneration which is relatively common in ulcer of the stomach is practically never seen in ulcer of the duodenum. As a rule cancer of the small intestine causes symptoms of stenosis rather late. Therefore it is usually operated upon late and the end results are poor. Sarcoma of the small intestine is also rare, and the results of its treatment are also very poor.

7 Carcinoma of the colon and rectum. Cancer of the colon is a common disease. If it is recognized and operated upon in the early stages, good results may be obtained. It should be suspected in the cases of all elderly patients who suddenly develop obstruction after previously regular and normal bowel movements. An important sign of the condition is the passage of blood and mucus. The author emphasizes the importance of digital examination followed by rectoscopic and sigmoidoscopic examination. In cases in which the lesion is situated high x ray examination is necessary. Frequently a severe anemia is the first sign of the disease. In doubtful cases the examination should be repeated after an interval not exceeding two weeks or an exploratory operation should be done. Advanced age does not contra indicate exploratory operation. In the stage of obstruction of the bowel the author performs a colostomy first and the radical operation later. As a rule the resection should be done in 2 stages (1) mobilization and resection, and (2) closure of the colostomy. However if the bowel can be

emptied completely, Finsterer performs the operation in 1 stage. In carcinoma of the left half of the colon with severe obstipation he performs the 3-stage operation of Schloffer (1) cecostomy, (2) extirpation of the cancer, anastomosis of the transverse colon to the pelvic colon, and (3) closure of the cecostomy opening. The mortality in his cases has been 21 per cent, but in the last eight years has dropped to 16 per cent. In carcinoma of the pelvic colon the abdominosacral operation is the procedure of choice. For the radical removal of cancer of the rectum there is a choice of 2 methods (1) the sacral operation of Hochenegg, and (2) the abdominosacral operation of Kirschner and Schmieden. Finsterer is performing the latter more and more frequently. He always preserves the sphincter if the carcinoma is situated 12 cm or more above the anus. The mortality of the abdominosacral operation in his cases is 18 per cent. The incidence of permanent cure in his cases of cancer of the colon is 34 per cent.

Finsterer comes to the conclusion that in carcinoma of the digestive tract the mortality of operation has decreased and permanent cures are no longer rare.

(MAXIMILIAN HIRSCH) LEO A. JULKE, M.D.

Cunha, F. Idiopathic Benign Hypertrophic Pyloritis. *Am J Surg*, 1936, 33, 21.

Cunha emphasizes that idiopathic benign hypertrophic pyloritis is not a simple acute or chronic inflammatory gastritis with the well known mucosal changes accompanying those conditions but a clinical entity with characteristic changes which are limited strictly to the pylorus. The most predominant feature is hypertrophy chiefly of the mucosa and submucosa. The mucosal layer shows marked thickening which causes an increase in the size of the mucosal folds so that they encroach on the pyloric lumen and interfere with egress from the stomach. Secondary stasis, either moderate or extreme, results. After death the edema or congestion rapidly diminishes or disappears so that postmortem specimens are not always satisfactory for demonstration purposes.

The condition is frequently undiagnosed or diagnosed erroneously. Errors in diagnosis have been responsible for the performance of a fairly large number of operations, especially gastric resections, in the belief that the condition was malignant. In the majority cases, however, the differential diagnosis may be made if all of the clinical findings together with the findings of careful fluoroscopic and roentgenographic examinations are taken into consideration.

The condition is a lesion primarily of the mucosal and submucosal layers extending the complete length of the pyloric canal but sharply confined to the pylorus in contrast to other lesions which extend beyond these limits. It is not the persistence of a pyloric stenosis from infancy.

JOHN W. NEUM, M.D.

Gage, M., Ochsner, A., and Hosoi, K. The Relationship of Gastric Acidity to Peptic Ulceration. I. The Effect of Hydrochloric Acid, of Histamin, and of Deviation of Bile. *Arch Surg*, 1936, 32, 1019.

The authors report the findings of experiments which were carried out on 125 dogs. In one group of experiments the animals were given hydrochloric acid by mouth or injections of histamin subcutaneously. The gastric acidity was determined before and after the administration of the hydrochloric acid or the injection of histamin. In the group of animals receiving hydrochloric acid, petechiae, erosions, and shallow ulcers were found, but not the chronic ulcers seen in man. There was considerable variation in the gastric acidity, but no constant increase. The injection of histamin produced acute ulcers, but, as evidenced by the scars found in the stomachs of the sacrificed animals, did not prevent their healing.

In another group of experiments the greater curvature of the stomach was resected and the lesser curvature left intact. In a third group the lesser curvature was resected and the greater curvature left intact. Extirpation of the greater or lesser curvature of the stomach did not significantly change the gastric acidity of the main portion of the stomach as compared with the preoperative values. When the greater curvature was extirpated and the lesser curvature left intact, the incidence of ulceration was 63.6 per cent, whereas when the lesser curvature was removed and the greater curvature left intact, no ulcers occurred. These facts, together with the observation that, following the injection of histamin, multiple ulcers occurred most frequently along the lesser curvature support the clinical observation that gastric ulcer generally occurs along the lesser curvature (Magenstrasse). The higher incidence of ulcers in the lesser curvature is due to the tissue susceptibility of that portion of the stomach.

In other experiments pouches were formed in the lesser or greater curvature and anastomosed to a loop of jejunum. Of the dogs in which a pouch of the greater curvature was formed, ulcers developed in 100 per cent, whereas of the animals in which a pouch of the lesser curvature was formed, ulcers developed in only 71 per cent. Jejunal ulceration is due to the acid gastric chyme impinging against a portion of the intestinal tract which is not accustomed to receiving it. The higher incidence of ulceration when the greater curvature was anastomosed to the jejunum than when the lesser curvature was anastomosed was probably due to higher acidity in the greater curvature.

In further experiments a pouch of the lesser or greater curvature was anastomosed to the jejunum and, in addition, the common bile duct was ligated and the fundus of the gall bladder sutured to the pouch. The protective influence of the alkaline bile was demonstrated by the fact that of the animals in which the pouch of the lesser curvature was used, ulcers developed in only 50 per cent whereas of the animals in which the pouch of the greater curvature

was anastomosed to the jejunum and the gall bladder, ulcers developed in only 28 per cent

From the results of experimental work and their clinical observations the authors conclude that there are three factors operative in the production of peptic ulcer (1) predisposition (ulcer diathesis), (2) susceptibility of tissue, and (3) hyperacidity

Sanchez Martinez J A, and Chamorro R
Studies of Disturbances in Electrolytic Equilibrium and the Pathological Anatomy of Gastritis in Experimental Gastric Ulcer The Results Obtained by Drainage of the Secretions of the Pyloric Antrum, the Duodenum the Pancreas and the Liver to the Exterior (*Estudios fisiológicos y anatómicos de las gastritis y úlceras gástricas experimentales. Resultados obtenidos con la derivación de jugos natro duodenal, pancreático y biliares al exterior*) *Arch de med, cirurg y especial* 1936 17 229

The authors report experiments carried out on dogs in which they sectioned the stomach transversely at the antrum re established gastro intestinal continuity by termino lateral gastro enterostomy in which the end of the sectioned fundus was united to the side of the beginning of the jejunum closed the distal end of the sectioned antrum with a double row of Cushing sutures and exteriorized the second portion of the duodenum so that the pancreatic biliary duodenal, and antral secretions were lost

After this operation the animals showed acute and marked lowering of the alkali reserve the blood magnesium and the blood calcium and died within from two to five days Necropsy was performed immediately after death In all of the dogs an intense diffuse hemorrhagic gastritis with gross changes was found In three there was a hyaline necrosis with degeneration of the entire stomach wall The pathological process was most marked around the arterial and venous capillaries There was no inflammatory infiltration The rest of the animals showed a marked generalized hemorrhagic gastritis associated with edema and inflammatory infiltration Except in one dog with an acute ulcer and two dogs with ecchymosis the duodenum and jejunum were macroscopically negative On microscopic examination however they showed superficial erosions In some of the animals the examination revealed involvement of the deeper layers in others a generalized inflammatory infiltration with degeneration of the mucosa and in the rest disappearance of the glandular structure of the duodenum and the mucosa of the jejunum In all the antrum was macroscopically negative but on microscopic examination showed hyperplasia of the interstitial connective tissue and pathological changes of the following types

- 1 An intense inflammation with glandular destruction
- 2 Erosion in an atrophic follicular gastritis of the type described by Kalma
- 3 Erosion in an atrophic hypertrophic gastritis a type of gastritis not previously reported in the literature on experimental gastritis

4 A type of sclero atrophic hyaline gastritis, and a type of chronic sclerofibromatous gastritis

Comparisons of the lesions produced experimentally in the antrum and stomach were made to determine the difference in the reaction of the mucosa of the antrum and that of the fundus when both were subjected to the same chemical or mechanical irritative stimuli The differences were secondary to the fact that the antral mucosa has a tendency to produce cicatricial sclerosis whereas in the fundus such sclerosis is rare, also to the fact that the fundal mucosa regenerates itself by the production of flattened epithelial cells of the Moszkowicz type while the antral mucosa regenerates itself by the production of epithelial cells

The authors conclude that marked changes in the acid base equilibrium and mineral metabolism lead to acidosis and demineralization from the loss of alkaline gastric, duodenal, pancreatic and biliary secretions The macroscopic lesions caused by loss of alkaline secretions were the same in all of the dogs They consisted of generalized passive congestion marked hemorrhagic gastritis and pangastritis Macroscopically, the duodenum, jejunum and antrum were, with few exceptions uninjured but on microscopic examination they showed evidence of damage In the dogs with the most intense systemic disturbances microscopic lesions of the duodenum such as an acute ulcer and localized ecchymosis were produced

The histological study suggested that the systemic condition was of major importance in the causation of the lesions and inflammation of only secondary importance The histopathological changes in the stomach varied in the different animals from necrotic hyaline degeneration of the entire wall of the stomach to a generalized inflammatory infiltration with marked erosion of the gastric mucosa Various evolutionary intermediate stages could be demonstrated The major changes seen in the duodenum and jejunum were generalized inflammation and erosion Under the influence of the same irritative stimuli the antrum showed a type of hemorrhagic lesion which differed from that occurring in the fundus because of the difference in the reaction of these two parts to the stimuli SAMUEL J FOGELSON, M D

Babey A M and Hurst A F The Incidence Mortality and Treatment of Hemorrhage in Gastric Duodenal and Anastomotic Ulcer *Guy's Hosp Rep Lond* 1936 86 129

The authors first cite 2 articles on hemorrhage in cases of peptic ulcer which were published in 1935—one by Gordon Taylor and the other by Meulen-gracht Gordon Taylor reviewed the records of the Middlesex Hospital London, for the years from 1924 to 1933 These showed that in medically treated cases admitted for hematemesis the mortality was 21 per cent and in cases in which another large hemorrhage occurred after the patient's admission it rose to 78 per cent Gordon Taylor therefore advised routine surgery after preliminary transfusion

Meulengracht presented statistics which showed that in 251 cases of bleeding ulcer treated medically the mortality was only 1 per cent. The lowness of the mortality was attributed to the practice of feeding the patients very early after hemorrhage.

To determine which of these extremes of mortality is correct, Baby and Hurst reviewed cases of peptic ulcer treated at Guy's Hospital and the New Lodge Clinic, London.

The Guy's Hospital group consisted of 371 cases of chronic gastric, duodenal, and anastomotic ulcers admitted during the years from 1909 to 1935. Eighty-two (22 per cent) of the patients had bled within forty-eight hours before their admission, and 106 (29 per cent), including 32 of those with recent bleeding, had a previous history of hemorrhage. Of the 82 patients who were admitted to the hospital for hemorrhage, 54 (66 per cent) had gastric ulcers, 22 (26 per cent), duodenal ulcers, and 6 (8 per cent), anastomotic ulcers. Fifteen of the 82 had at least 1 more hemorrhage during hospitalization. Five of these 15 died. Four died directly as the result of continued bleeding and 1 nine weeks after the hemorrhage from peritonitis following separation of the jejunostomy. Therefore in the cases in which bleeding recurred under treatment the mortality was 21 per cent. As the 4 deaths cited were the only deaths directly attributable to hemorrhage, the mortality due to hemorrhage was 4.8 per cent in the 82 cases admitted to the hospital on account of hemorrhage, 2.5 per cent in the 160 cases with a history of 1 or more hemorrhages at the time of admission, and 1.1 per cent in the total 371 cases including those in which bleeding had never occurred.

In the period from February 21, 1921, up to the time that this study was made, 586 cases of ulcer were admitted to the New Lodge Clinic. Among these were 110 cases of gastric ulcer, 379 of duodenal ulcer, and 97 of anastomotic ulcer. One hundred and sixty-one (27.5 per cent) of the patients—23 (20.0 per cent) of those with gastric ulcer, 91 (24.0 per cent) of those with duodenal ulcer, and 47 (48.5 per cent) of those with anastomotic ulcer—were admitted with hemorrhage. Three patients, all with duodenal ulcer, died of hemorrhage. These were the only ones recognized as being unlikely to recover under medical therapy and therefore were the only ones operated upon while still bleeding. Surgery failed to save them.

As the mortality appears to be higher where transfusion is often employed than elsewhere, the authors are of the opinion that transfusion is not without danger. They quote Christiansen as saying that in the Kommunehospitalet the mortality has doubled since transfusion has become a common practice. They state that, in general, transfusion should not be done unless the hemoglobin is below 30 per cent and the patient appears to be in danger of death from anemia.

From their findings the authors conclude that the incidence of hemorrhage in peptic ulcer is 27 per cent

and that the mortality is only 1.5 per cent. Surgery cannot be regarded as a means of preventing fatal hemorrhage. According to Balfour, hemorrhage occurred after operation at the Mayo Clinic in 13 per cent of cases of ulcer with a previous hemorrhage and in 0.9 per cent of those with no history of previous hemorrhage. Even gastrectomy does not prevent recurrence of hemorrhage. Moreover, the total mortality of all operations performed for gastric and duodenal ulcer is considerably greater than the mortality of hemorrhage in all cases of ulcer.

In the authors' opinion it is not difficult to recognize the rare cases of bleeding ulcer in which recovery will not result under medical therapy. Unfortunately they are the cases in which direct treatment of the bleeding point by operation is likely to be impossible. Therefore even when the operation is performed by surgeons of great experience and the patients have been adequately prepared by transfusion, the postoperative mortality must be extremely high. The authors are of the opinion that the early feeding advocated many years ago by Lenz and recently by Meulengracht would not have prevented the deaths in the cases they review. They state that the remarkably low mortality among patients seen in general practice shows that, in the great majority of cases, rest in bed, starvation, and the administration of morphine are all that is required.

SAMUEL J. FOGELSON, M.D.

Pratt, G. H. The Diagnosis of Cancer of the Stomach: The Use of the Gastroscope and the Gruskin Test. *Arch. Surg.* 1936, 33, 138.

The Gruskin test is based on the consideration that malignant cells are born embryonic and remain embryonic in contrast to normal cells, which are born embryonic, but which mature. The protein of malignant cells is not the same as that of normal cells. This is shown chemically by the fact that in incineration of malignant growths leaves a heavy deposit of inorganic salts similar to the heavy deposit found after the incineration of embryonic cells, while the incineration of normal cells or benign growths leaves no such deposit or only a trace of inorganic salts.

The Gruskin test consists of the injection of an embryonic antigen made from the most embryonic cells known. For the diagnosis of carcinoma an antigen from the epithelial cells of embryonic calves' pancreas or liver is used, and for the diagnosis of sarcoma, an antigen from Wharton's jelly which contains the embryonic stellate connective tissue cells.

The results of 100 Gruskin tests made in cooperation with Gruskin were as follows:

Correct results, 92; incorrect results, 8, positive reactions, 74, percentage correct, 81.8; negative reactions, 26, percentage correct, 76.9.

These figures show that in the cases of 8 patients the positive reaction to the test did not agree with the findings of clinical study. Some of these 8 patients may present clinical evidences of malignant change later.

In conclusion the author states that while more investigation regarding the possibilities of the Grushin test are necessary before acceptance of this test over clinical judgment may be advocated, the results so far have been encouraging

JOSEPH K. NARAY, M.D.

Winnes J. F. and Geschickter, C. F. Some Clinical Features of Carcinoma of the Stomach
Am. J. Cancer 1936, 27, 740

Cancer of the stomach is a lesion with a high incidence and mortality. It is usually recognized clinically only after it has reached an advanced stage. An analysis of 541 cases was made by the authors to evaluate the various clinical signs and symptoms and to develop a more methodical clinical approach to the problem.

In 47.6 per cent of the 541 cases a readily palpable mass was found in the epigastrium. In 36.4 per cent exploration showed the lesion to be inoperable. In 13.3 per cent the patient had been advised against operation by a physician and in 5 per cent, the patient refused surgery.

Of 370 patients followed, only 3.5 per cent were alive at the end of five years.

The delay in the recognition of cancer of the stomach may be attributed to the insidious onset of the condition, the patient's ignorance of the potential danger of the vague early gastric symptoms and the physician's neglect of the early symptoms. In 41 cases of gastric cancer occurring in physicians, Alvarez found that the duration of the symptoms was no less than in the laity.

It is believed that competent roentgenological examination more nearly establishes the diagnosis than other clinical methods. A suggestive history, a gradual loss of weight, a distaste for food and mild epigastric distress should lead to a laboratory investigation or possibly exploratory operation.

WILLIAM E. SHACKLETON, M.D.

Wakefield E. G. and Mayo C. W. Intestinal Obstruction Produced by Mesenteric Bands in Association with Failure of Intestinal Rotation
Arch. Surg. 1936, 33, 47

Like obstruction developing in later life, congenital intestinal obstruction may be classified as intrinsic and extrinsic. Congenital atresia must not be confused with pyloric stenosis and the resulting obstruction in the newborn infant. In the latter the obstruction is caused by hypertrophy of the muscular coats of the intestine and not by atresia.

Both intrinsic and extrinsic congenital intestinal obstruction are rare. The authors discuss the latter condition in which the obstruction is produced by ligaments, bands or abnormal fixation of the duodenum and colon and may originate in one of two ways. The bands may be remnants of embryonic structures which normally disappear or they may be the result of peritoneal adhesions which have occurred in intra-uterine life. If intestinal bands that produce extrinsic intestinal obstruction are remnants

of pre-existing fetal bands which are either of peritoneal or of mesenteric origin, they must have an anatomical situation which corresponds to the site of bands or folds of the peritoneum or mesentery known to have existed at some period of fetal development. On the other hand if it is assumed that these bands are the result of prenatal or postnatal peritonitis, their anatomical situation is not important.

Frazer and Robbins have made comprehensive embryological studies of the factors concerned in rotation of the intestine in man and for the sake of description, have divided rotation into three stages.

In the first stage of rotation in a 7.5 mm. embryo the umbilical loop has been formed and is herniated into the umbilical cord as the result of intra-abdominal pressure and the increasing length of the intestine. By the time the embryo is 10 mm. long the umbilical loop has turned about 90 degrees to the right from a sagittal to a horizontal plane. This turning of the umbilical loop to the right is the result of its close approximation to the umbilical vein and the liver and represents the first stage of rotation.

In the second stage of rotation the intestine returns to the abdomen from the umbilical loop. The mechanism of this return is purely physical, the intestine is literally sucked back into the abdomen by the combined effect of a decrease in the rate of growth of the liver, an increase in the resistance in the umbilical hernia caused by the ever enlarging intestine, an increase in the pressure of the amniotic fluid outside the hernial sac and a collapse of the lower part of the abdominal wall.

In the third stage of rotation the small intestine occupies the left side of the abdomen. The ileum enters the colon from left to right. The descending portion of the duodenum is dorsal to the colon. The superior mesenteric artery, which formerly occupied the duodenocolic isthmus, passes anterior to the duodenum. The original branches of the artery on the right are now its branches on the left and instead of the arteries being on the left side of the veins, as before they are on the right.

The cases in which there was failure of rotation of the intestine have been divided into three groups: (1) those in which there were signs and symptoms of intestinal obstruction without other complicating disease of the digestive tract; (2) those in which there were signs and symptoms of organic disease of the digestive tract with or without intestinal obstruction; and (3) those in which definite disease of the digestive tract did or did not exist and the failure of intestinal rotation was discovered accidentally on roentgenographic study or in the course of abdominal exploration for other reasons.

A study of fifteen cases of failure of the second stage of intestinal rotation demonstrates that congenital mesenteric bands which are capable of producing intestinal obstruction are commonly associated anomalies. The frequency of this association is not known. Obstruction of the intestine by congenital bands is produced by maintenance of their

known embryonic function of traction and fixation of the segments of the intestine in the region of the primitive mesentery which forms the duodenocolic isthmus. A consideration of the general aspects of congenital intestinal obstruction and the anatomical situation of congenital mesenteric bands is presented. Definite visualization of intestinal rotation is obtained by comparative anatomical studies.

Hibbard, J. S. Gaseous Distention Associated with Mechanical Obstruction of the Intestine. *Arch Surg*, 1936, 33: 146.

Hibbard reports the findings of complete qualitative and quantitative analyses of gases occurring in association with experimental obstruction of the small bowel. The average percentage composition of the different gases was as follows:

Nitrogen, 70 per cent. This percentage was in agreement with the high percentages occurring in the gases associated with other conditions which have been reported in the literature.

Carbon dioxide, from 6 to 9 per cent. This concentration approached that found in gases in the blood.

Oxygen, from 10 to 12 per cent. After a seventy-two hour period there was a definite fall to a uniformly low figure.

Hydrogen, less than 1 per cent in only one case. After death in three cases, the concentration was from 1 to 3 per cent.

Methane, less than 1 per cent in only one case. Gases of the volatile basic group, from 0.5 to 5 per cent.

Hydrogen sulphide, from 1 to 10 per cent, but in increasing from 14 to 17 per cent as the severity of the obstruction increased. A marked increase occurred after death.

A quantitative determination of the gases associated with mechanical obstruction of the small bowel according to their origin was attempted by comparing the gaseous content of open and closed intestinal loops. About 72 per cent of the gas present was estimated to have been derived from swallowed air. The amount formed within the body was 28 per cent. Of the latter, 70 per cent originated from diffusion of gases from the blood into the lumen of the bowel, and the remaining 30 per cent from the decomposition of food material.

The character of the diet and of the material present in the intestine apparently had little effect on the ultimate character or quantity of the gases present. The effect of the biliary and pancreatic secretions could not be accurately determined, but the observations suggested that they had little to do with the type or quantity of gases formed. The marked increase of hydrogen sulphide after death was explained by the sudden drop in the hydrogen-ion concentration of the fluid contents of the bowel to the acid side. Neither hydrogen sulphide nor ammonia caused symptoms of toxicity when injected into a loop of bowel, provided the percentage of gas in the injected was no greater than that occurring in cases of

simple obstruction. Neither were symptoms of toxicity produced by the injection of a solution saturated with hydrogen sulphide into closed loops of the small intestine.

The character of the gas occurring in clinical cases of obstruction of the small bowel did not differ appreciably from that of the gas formed in association with experimental obstruction. In both the clinical and the experimental cases of obstruction of the small bowel, gases of the combustible group were absent. Analyses of gas obtained in cases of paralytic ileus following peritonitis showed positive reactions for hydrogen and methane, which indicated an intermixture of gases from the small and large bowel. Otherwise the composition of the gas resembled that of the gas formed in cases of mechanical obstruction. Samples of gas obtained by suction applied to an intubating duodenal tube in clinical cases of obstruction of the large bowel were free from combustible gases. The gas taken directly from the intestine in comparable cases invariably showed small amounts of hydrogen and methane. These results demonstrate competency of the ileocecal sphincter.

JOSEPH K. NARAT, M.D.

Bottin, J. Infection as the Cause of Death Following Experimental Intestinal Obstruction (L'infection comme cause de la mort à la suite d'une occlusion intestinale expérimentale). *Rev. belge de méd.*, 1936, 6: 46.

According to one of the oldest theories, the cause of death following experimental intestinal obstruction is infection. Recently this theory has again been brought into prominence by Lauwers who is of the opinion that death in this condition is due to peritonitis resulting from changes in the intestinal wall brought about by gaseous distention of bacterial origin. Some investigators have noted the occurrence of hematogenous metastatic foci of infection, such as bronchopneumonia and acute ulcerative endocarditis, following intestinal obstruction. In the large series of animals studied by the author bronchopneumonia was extremely rare except in very young or very old dogs, in which the condition is more common than in dogs of medium age even in the absence of intestinal obstruction.

Infection during the course of intestinal obstruction may occur as a localized or generalized peritonitis or by liberation of intestinal bacteria into the blood stream with or without the formation of metastatic intravisceral lesions. As a rule necropsy on an animal sacrificed when it is in a serious condition from high intestinal obstruction will reveal in the peritoneal cavity from 20 to 50 c.m. of hemorrhagic fluid without the slightest odor and without the appearance of ordinary pus. If this fluid is with drawn under strictly aseptic conditions it can easily be demonstrated to contain colon bacilli, perfringens bacilli, enterococci, staphylococci, and streptococci.

In the experiments reported by the author, the cultures were divided into two groups, aerobic and anaerobic. In the former the various organisms were

isolated successively and studied microscopically by the hanging drop method, by culture on selected media, and by incubation. For the anaerobes the method of Neisser was used.

It was noted that as a rule the hemorrhagic fluid found in the peritoneal cavity of dogs with obstruction of the small intestine contained a small number of various organisms. The migration of bacteria seemed very slight and in no instance had it given rise to definite peritonitis.

It therefore appears that in a certain number of instances intestinal bacteria pass through the wall of the intestine into the peritoneal cavity. Nearly always the obstructed end of the intestine is enclosed in a band of omentum but in only a very few cases is a drop of pus found when this is raised. Therefore it is exceptional for evidences of localized peritonitis to be discovered at the site of the obstruction if the operation is performed with proper precautions for sepsis and special care is taken to insure perfect approximation of the serous surfaces at the level of the obstruction. In the author's experiments on dogs the incidence of local peritonitis was only a per cent and its cause was always found to be insufficiency of the sutures.

The author's experiments showed that bacteremia is relatively frequent following obstruction of the duodenum. However it was always of slight degree, and the only bacteria isolated were the colon bacillus, the bacillus perfringens, or enterococci.

When the ileum was obstructed a migration of intestinal bacteria into the blood occurred in a certain number of the experimental animals. The bacteremia appeared to be more marked after ileal obstruction than after duodenal obstruction. The portal blood seemed to contain more bacteria than the cardiac and jugular blood. It appears to the author that some of the bacteria gaining entrance to the portal system are arrested at the liver. The organisms demonstrated were colon bacilli, streptococci, enterococci, and the bacillus perfringens.

Similar examinations were made in the cases of dogs after the continuity of the intestines had been restored under local anesthesia in order to reduce the possibility of intestinal paralysis from general anesthesia. Under such conditions and when there was no suppurating focus the bacteremia was found to be diminished on the following day and to have disappeared altogether at the end of forty-eight hours.

From these experiments the author concludes that, in dogs, bacteria quite frequently pass into the blood stream following intestinal obstruction. In cases of high obstruction the number of bacteria gaining access to the blood is not large and the animals usually die without symptoms of severe blood infection. When the obstruction is lower down the bacteremia is more marked. Infected wounds or foci may cause bacterial dissemination in the blood stream which tends to confuse the findings.

The bacteremia following intestinal obstruction is of only secondary importance in explaining deaths

due to experimental intestinal obstruction. The bacteria caught in the capillary network of the liver are few, and in no instance has an intrahepatic abscess been found. Bronchopneumonia is a much more common sequel of intestinal obstruction in man than in the dog. In man, blood cultures during obstruction are almost constantly negative. The bronchopneumonia is most probably due to factors extrinsic to the obstruction. The author was never able to demonstrate the endocarditic lesions which Gurewitsch observed in 60 per cent of dogs with intestinal obstruction.

None of the author's findings points to infection as an important factor in the causation of the serious sequelae of intestinal obstruction. The localized or generalized peritonitis as well as infection of the blood or lymph streams are discrete and inconstant and if they play any part it is subsidiary.

EDITH SCHRAMME MOORE.

Nixon S., and Nixon B. Acute Appendicitis in Children. *Am J Dis Child*, 1936 51 1296

The authors advance a theory to explain the syndrome of acute appendicitis in children on the basis of two distinct groups of symptoms: those arising through the visceral nerve fibers and those traveling by way of the somatic fibers.

They believe that early and probably because of an attempt on the part of the appendix to empty itself of its irritating contents tension is produced on the nerve endings within the wall of the viscus. This results in restlessness, sleeplessness, anorexia or an abnormal appetite and abnormal intestinal habit. Soon the threshold of visceral pain is overcome, and colicky pain in the upper abdomen is evidenced by paroxysms of crying. At this stage the child does not appear acutely ill and the abdomen is usually silent.

If the attack goes on and is not relieved by evacuation of the contents of the appendix into the cecum but results in complete interstitial inflammation or perforation the visceral symptoms and vomiting if vomiting has occurred, will cease and the child will change markedly in demeanor lying quietly in bed frequently with the knees drawn up because of sharp stabbing pain in the right iliac fossa. With the onset of these somatic symptoms tenderness and muscular rigidity first appear. A rise in the temperature and costal breathing are likely to occur, and the vomiting may recur.

The authors call attention to the fact that somatic symptoms with marked rigidity and tenderness may be absent if the appendix is located so that the parietal peritoneum is not involved.

They believe that acceptance of the theory of independent involvement of the sympathetic and cerebrospinal nervous systems will greatly assist in the interpretation of the symptoms of appendicitis in children because the course is frequently rapid and somatic symptoms are frequently absent or difficult to elicit until perforation and peritoneal involvement have occurred. L. W. CHRISTIAN, M.D.

Soli, D. Pseudomyxoma of the Peritoneum of Appendicular Origin (Il pseudomyxoma del peritoneo ex appendice) *Clin chir*, 1930, 12 307

In reviewing the literature, Soli found that the term "pseudomyxoma of the peritoneum" was first used in 1884 by Werth to indicate the condition which results from the rupture into the peritoneal cavity of a mucoid or colloid cyst of the ovary or of metastatic implants of ovarian cysts undergoing epitheliomatous degeneration. However, it seems that this condition had been discovered in 1871 by Pean, who called it "gelatinous disease of the peritoneum" and believed it to originate from the peritoneal serosa. Since that time numerous cases have been observed.

Soli reports a case of pseudomyxoma of the peritoneum of appendicular origin occurring in a man forty two years old who for three years had suffered from gastric disturbances. While the patient was riding in an automobile he was severely jarred and developed a severe pain in the cecal fossa. A physician advised hospitalization.

Under morphine ether anesthesia the peritoneal cavity was opened and the cecal fossa found to be filled with a gelatinous mass completely enveloping the cecum, the appendix, and the free margin of the omentum. The appendix was removed and the peritoneal cavity emptied as completely as possible. Uneventful recovery resulted.

On gross examination, the removed appendix was found to be hydropic, rigid, and markedly dilated. In one area, the wall of which consisted of only the internal tunic, rupture had occurred.

Histological examination of the appendix revealed essentially mucous degeneration of the wall along its entire length. The anatomical diagnosis was retroperitoneal pseudomyxoma of appendicular origin.

The condition seems to occur most frequently after the thirtieth year of age. It has been established that a pseudomyxoma may develop from the rupture of a sterile, appendicular hydropic mass. The rupture is usually caused by trauma and is rarely the result of an infectious ulcerative necrotic process.

The gelatinous masses may be whitish, amber yellow, or gray. They are usually acellular, but in some cases may contain lymphocytes, erythrocytes, and stellate cells of the connective tissue type. As a rule they are sterile, but some investigators have reported the presence of bacterium coli.

As no specific symptoms are associated with the condition, a clinical diagnosis is practically impossible. In the differential diagnosis, appendicular abscess, true neoplasms, and ovarian pseudomyxoma must be ruled out. The roentgen findings are misleading.

In the majority of cases the patient recovers following appendectomy and removal of the gelatinous masses. Some investigators have recommended postoperative radium or roentgen irradiation.

RICHARD E. SOMMA, M.D.

Lindner, H. H., and Wood, W. Q. Melanoma of the Rectum. *Brit J Surg*, 1936, 24 65

Melanoma of the rectum is an uncommon disease. It is of interest particularly from the point of view of its pathogenesis and its relationship to the other forms of melanomas. In the alimentary canal apart from the rectum melanomas are exceedingly rare.

The authors report a case of rectal melanoma in a woman fifty three years of age who gave a history of rectal pain and the passage of blood on defecation for the past four months. Constipation was not a prominent feature, and the general health had remained satisfactory. Digital examination of the rectum revealed a painful swelling situated at the level of the anorectal junction. This swelling was mainly on the posterior wall. There was no enlargement of the inguinal glands. The condition was heaved to be an adenocarcinoma of the rectum.

Inguinal colostomy was performed. The liver was free from metastases, and there was no evidence of metastases in the peritoneum or the glands of the pelvic mesocolon. As the tumor was not adherent to the perirectal tissues it was judged suitable for operative removal. On September 8, excision of the rectum by the perineal route was performed. The coccyx was excised, the peritoneal cavity opened freely, and the bowel divided through the lower part of the pelvic colon. After closure of the peritoneum and the proximal end of the colon, the cavity was packed with gauze and allowed to heal by granulation. The patient made a good recovery from the operation and when examined in April, 1936, showed no gross evidence of metastases.

This case may be regarded as typical. Clinically, the symptoms resemble those of adenocarcinoma of the rectum. However, the blackish discharge on the examining finger may arouse suspicion of the nature of the tumor. The melanoma bulges into the lumen of the bowel. It does not spread in annular fashion to cause stenosis of the bowel lumen. It is derived from the stratified squamous epithelial portion of the anal canal. Regional lymph nodes containing pigmented cells are not necessarily the site of metastases.

JOHN W. NUZZI, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Santy, P., and Mallet-Guy, P. Lithiasis of the Intrahepatic Bile Ducts (La lithase des voies biliaires intra hépatiques). *Lyon chir*, 1936, 33 257

Santy and Mallet-Guy discuss the clinical aspect of lithiasis of the intrahepatic bile ducts on the basis of some cases of their own and a study of twenty five cases collected by their student, Sorlin, in his thesis. Intrahepatic biliary calculi are of importance chiefly because they may be responsible for the failure of well planned complete operations on the extrahepatic bile ducts.

Such calculi may be scattered throughout the bile ducts, involving all of the liver parenchyma, or localized in one or more branches of the intrahepatic

bile ducts, involving only one lobe. Of Sorlin's twenty five cases, thirteen were of the diffuse type and twelve of the localized type.

In the majority of cases the calculi are discovered at autopsy on patients who have been operated for biliary duct disease or who have shown symptoms of such disease for a long time. Occasionally they have been found in patients who were operated on because of symptoms of gastric perforation, subphrenic abscess or abscess of the liver. At operation on the gall bladder and bile ducts, an intrahepatic biliary calculus is rarely found in one of the first branches of the hepatic duct even if this duct and its bifurcation are explored.

Intrahepatic biliary calculi are most often found at autopsy in cases in which operation on the biliary tract—cholecystectomy or cholecystostomy—has failed to relieve the symptoms. In one of the authors' cases in which an emergency cholecystostomy followed by exploration of the common bile duct failed to relieve the obstruction and jaundice, autopsy disclosed diffuse biliary calculi in the intrahepatic bile ducts. In another case a choledochotomy was done for calculi in the common bile duct. Although the stones were successfully removed, there were postoperative symptoms of liver insufficiency and the patient died. Autopsy revealed numerous calculi in the intrahepatic ducts. Such calculi are found at autopsy also in the cases of patients who recover after a primary operation on the gall bladder or bile ducts and subsequently develop icterus and pain which are not relieved by a second operation. In one of the authors' cases a choledochotomy was done for suppurative angiocholitis and the patient made a good recovery. Four months later she developed symptoms of abscess of the liver. In spite of operation and drainage, the suppuration continued. Autopsy showed multiple calculi in the intrahepatic ducts. There are reports of cases in which patients were free from symptoms for longer periods—up to several years—before recurrence of symptoms due to the intrahepatic calculi.

The authors have found that ordinary roentgenography rarely reveals the presence of intrahepatic biliary calculi. If an opaque area is shown in the liver area it is difficult to determine whether it is a calculus or an area of calcification in the liver parenchyma. On the other hand roentgenography after the injection of lipiodol into the bile ducts shows clear areas in the opaque medium if intrahepatic stones are present. Such a roentgenographic study may be made in the course of, or soon after, operations on the biliary tract.

In cases with numerous calculi scattered throughout the intrahepatic biliary ducts, which have resulted in the destruction of large areas of the liver parenchyma, the condition is fatal and operation is not indicated. In cases of localized intrahepatic calculi, removal by hepatotomy is possible. For this operation the authors advise the use of the electric cutting current. While the stones may be located

by palpation of the liver, they prefer roentgenographic study with the injection of lipiodol at the time of the primary operation for gall stones or for stones in the common duct. A single roentgenogram is sufficient. ALICE M. MEYERS.

Baccarini, L. A Contribution to the Study of the Pathogenesis of Polycystic Liver (Contributo allo studio della patogenesi del fegato policistico). *Arch ital di chir.*, 1936, 43, 92.

The author reports a case of congenital polycystic liver in a child six months old. From careful study he concluded that the cysts were produced by malformation of normal constituents of the organ, and that the case was one of 'amartoma'.

The father of the child had had a questionable luetic infection many years previously and was operated upon for gastric ulcer three years prior to the child's illness. The mother had always been in good health, but had had one miscarriage at the third month of pregnancy. The patient was the third of three children born after the miscarriage. He had been breast fed since birth. A few days after his birth the mother noticed a constant abnormal protrusion of his abdomen. He was first brought to the clinic at the age of one month.

On examination he was found to be poorly nourished. The abdomen was very prominent as compared with the thorax and so tense that palpation revealed little besides the lower margin of the liver, which was 2 fingerbreadths below the umbilicus.

Liver puncture evacuated 5 c cm of a mucoid liquid which was found to contain albumin (trace), mucin, and biliary pigment. Spectroscopic examination revealed an absorption band covering the green and violet. The residue consisted of only amorphous debris.

After three weeks in the hospital the child was discharged, but was brought back regularly for re-examination. Several months after his discharge the circumference of the abdomen increased from 40.5 to 56 cm and the lower margin of the liver was 3 fingerbreadths above the pubis.

The von Pirquet and Wassermann tests were negative.

Liver puncture at the time of the patient's second admission to the hospital evacuated 750 c cm of an intensely green fluid. Stool and urine examinations and culture of the fluid were negative.

An exploratory operation with marsupialization of one of the larger cysts was done. The child died soon after the intervention.

At autopsy, the liver was found to measure 22 by 16 by 12 cm. As many of the cysts ruptured during the removal of the organ its weight could not be determined accurately. Its surface was irregular and was traversed by many deep sulci except over the quadrate and inferior surface of the left lobe. The cysts were trabeculated and contained a thick greenish fluid. The largest cyst was the size of a fetal head.

Histological examination revealed thickened connective tissue in a more or less wave like formation in the walls of the cysts, many dilated veins and arteries throughout the specimen, and numerous areas of degeneration throughout the interstitial tissue. The cysts were lined by columnar and cuboidal cells. Some of the living cells were almost squamous in type, showing highly colored nuclei rich in chromatin. There was much periportal proliferation of connective tissue. Because of the increased intrahepatic tension, most of the hepatic tissue in which function had been preserved was found in the periphery of the liver.

The author reviews the literature and discusses the histopathological differentiation of liver cysts in detail.

CARLOS S. SCUDERI, M.D.

Aronsohn, H. G. The Pathogenesis of White Bile. *Arch Surg*, 1936, 32, 2055.

The character of the bile found at operation for obstruction of the common bile duct varies greatly. The most characteristic bile is thick and dark green, but occasionally so called white bile is discovered.

Since white bile was first described by Courvoisier in 1890 the literature on the subject has become extensive and confusing. Whether or not the liver is functioning normally when such bile is produced is still unknown. At first the production of white bile was attributed to mechanical factors. Later the functional secretory theory was advanced, but many animal experiments yielded doubtful results. Many investigators now believe that infection is the important factor.

The author reports experiments on dogs in which he caused infection of stagnant bile by injecting bacteria into the obstructed biliary system. White bile was produced when obstruction of the common duct was prolonged. In two instances the white bile yielded the bacillus coli and in two the streptococcus hemolyticus and bacillus welchii.

In clinical cases the only sample of white bile examined contained the bacillus coli and bacillus welchii. In the cases reported in the literature in which the bacteriological findings in samples of white bile were negative, it is possible that at the time of the examination the bacteria were dead. In support of this theory the author cites long lasting abscesses that become sterile. He believes it may be said with some assurance that if bacteria and leucocytes are not present at the time of examination of the white bile they were present at some time during its formation.

Aronsohn reports four clinical cases in which white bile was found. These constituted 15 per cent of the total number of cases (twenty six) in which operation for obstruction of the common duct was performed at the University of Chicago Clinics during the last five years. The relatively high percentage may be explained by the fact that the statistics include cases in which the presence of white bile was discovered only on chemical examination. In all of the four cases the clinical history and the findings at

operation, and in one of them, the findings at autopsy indicated a long lasting infection accompanying the obstruction of the common duct. In contrast, the author reports two cases of long lasting obstruction of the common duct in which no evidences of infection were noted either clinically or at operation. In both of these the bile was dark green.

According to this evidence the formation of white bile in a closed biliary system is due to an infection of stagnant bile which has existed for a long time. From the physiological observations of Rous, Kausch, Bernhard, and others and the results of his experimental investigations, the author has arrived at the following conception of the manner in which white bile is formed.

In the closed system produced by obstruction a long lasting infection of sufficient virulence causes a decolorization of the stagnant fluid in the gall bladder and bile ducts. It is the original green bile that is acted upon. Possibly a small amount of secretion from the bile ducts may be mixed with this fluid, but in the closed system there is not enough space for any great amount of such secretion to accumulate.

The gall bladder may play an important role in determining the time necessary for the decolorization. A gall bladder that is functionally intact and in complete connection with the duct system exerts a concentrating effect and therefore lengthens the time necessary for the decolorization. When the gall bladder is separated from the duct system either anatomically or functionally, the decolorization takes place more quickly.

When the obstruction is relieved the white bile is swept out of the bile ducts and for a few days there is an increased quantity of colorless fluid which is the secretion of the mucous membrane of the ducts. As the latter has no relationship to hepatic bile, the application to it of the name "white bile" is incorrect. It may be produced by stimulation of the mucous membrane of the ducts resulting from the relief of the obstruction. J. EDWIN KIRKPATRICK, M.D.

Mallet Guy, P. Left Hemipancræatectomy in Three Cases of Chronic Pancreatitis Localized in the Body of the Gland (*Hémi pancréatectomie gauche dans trois cas de pancréatite chronique localisée au corps de la glande*). *Médecine Acad. de chir*, Par., 1936, 62, 559.

Case 1. A man fifty six years old had suffered for five years from crises of epigastric pain. On two occasions the pain was of such severity that the abdomen was opened, perforation of a peptic ulcer being suspected. At the second operation its cause was found to be pancreatitis. As there was an inflammatory nodule with considerable periglandular edema, the condition was evidently post necrotic. After the second operation the symptoms continued. Therefore, at a third operation, an 8 cm. portion of the tail of the pancreas was resected. The patient then made an uneventful recovery. At operation for a ventral hernia seventeen months later the remaining pancreatic tissue was found normal.

Case 2 A woman thirty nine years old had suffered for eighteen years from an ulcer syndrome and had been treated for ulcer. The course of the condition was characterized by the usual periods of exacerbation and remission. Five years before the patient was seen by the author a roentgen examination for gastric ulcer had been negative and she had been subjected to a gynecological operation without benefit. When she consulted Mallet Guy she was suffering from extremely acute pain in the epigastrium and left hypochondrium and vomiting. The epigastrium was rigid to palpation. Roentgen examination revealed a deformity of the lesser curvature of the stomach resembling a diverticulum and a concretion in the gall bladder. At operation, patches of fat necrosis on the gastrocolic ligament and induration and fat necrosis of the body and tail of the pancreas appeared normal. The operation consisted of partial resection of the pancreas and cholecystostomy with the removal of several large stones. The patient made an uneventful recovery and four months later was free from symptoms.

Case 3 The patient was a woman fifty three years old who entered the hospital with suspected intestinal obstruction. The history of her complaint went back thirty nine years. During that period of time she had suffered from dull pain in the left lumbar region. Recently she had had a series of attacks of violent pain with vomiting. Roentgenograms showed a large defect in the lesser curvature of the stomach due to an extrinsic mass. A diagnosis of chronic pancreatitis was made. At laparotomy, the body and tail of the pancreas were found lobulated, hyperemic and fixed. Immediately to the left of the midline there was a cavity filled with necrotic material. Partial pancreatectomy and cholecystostomy resulted in uneventful recovery.

The pathological changes in the three cases were essentially the same, consisting of extensive degeneration of the acini and a replacement fibrosis. The fibrotic tissue showed numerous dilated ducts. In Case 3, hemorrhages in various stages of resorption were found.

In the discussion of these cases BROcq stated that besides the well known acute hemorrhagic pancreatitis there are milder forms characterized by minor attacks of necrosis which may progress unrecognized for years and escape recognition even at operation. Therefore the pancreas should always be exposed when the lesions found at operation fail to explain symptoms in the upper part of the abdomen. The absence of stones in the common duct and of icterus in Mallet Guy's cases is noteworthy.

In the treatment of uncomplicated chronic pancreatitis, three procedures have been employed—pancreatolysis (mobilization), pancreatectomy and resection. The first two have resulted in numerous clinical cures. Resection is feasible only when the lesions are limited to the body and tail of the pancreas.

ALBERT F. DeGROAT, M.D.

Jirasek, A. J., Pstranec, O. and Henner, K.
An Operation for Hyperinsulinism with Hypoglycemia Caused by an Adenoma of the Islets of Langerhans. Cure (Opération de l'hyperinsulinisme avec hypoglycémie causée par un adénome des îlots de Langerhans guérison). *Bulletin Académie de chirurgie*, Paris, 1936, 62: 584.

Hyperinsulinism due to adenoma of the islets of Langerhans was first called to the attention of European physicians by Judd, Rynearson, and others in the United States. This article is the report of one of the first cases to be observed in Europe.

The patient was an engineer twenty six years old who had suffered from attacks of nervous symptoms over a period of five years. The first attack occurred after he had eaten his dinner with unusual avidity. On leaving the restaurant he staggered as though drunk. In addition to attacks of this kind, which occurred usually in the morning, he had periods of somnolence lasting as long as thirty six hours.

When he was examined in the third year of his illness there were no findings of note except obesity and myopia. He was treated as for migraine with luminal and "anacoline." The attacks continued to occur at intervals of several months and he continued to gain weight. On repeated examination, certain psychic symptoms became apparent. The patient was garrulous. He talked rapidly in a high voice, affected numerous mannerisms, and executed peculiar movements. He entered the hospital after a period of amnesia during which there were hallucinations and numerous bizarre actions. At this time the tendon reflexes of the left leg were found exaggerated and the Babinski reaction was positive. The cerebrospinal fluid showed a trace of globulin and a low sugar content but no other changes. The blood sugar varied from 27 to 56 mgm. When glucose was administered by mouth, the form of the blood sugar curve was normal but it proceeded from a low base. The curve revealed a certain resistance to insulin, the fall being 8 mgm. instead of the normal of 30 mgm. Subcutaneous injections of adrenalin produced normal curves with a peak of 75 mgm. The flattening of the curve described by others did not occur. The basal metabolic rate was -8.

As it was evident that the patient was suffering from hyperinsulinism, hypophyseal and thyroid extracts were prescribed. However, these were without effect. The symptoms could be controlled by increasing the frequency of meals, but under this treatment the patient made excessive gains in weight. Operation was therefore decided upon.

The pancreas was approached by a transverse incision with an angle in the direction of the umbilicus and an incision through the gastrocolic ligament. An intraglandular tumor the size of a hazelnut was found in the tail of the pancreas. It proved to be an adenoma containing extensive amyloid deposits.

The postoperative course was complicated by suppuration and fat necrosis in the wound, but complete recovery with entire relief of the symptoms of

hypoglycemia and a reduction in weight of 30 lb ultimately resulted.

The difficulties of operative treatment are emphasized. It must first be established that the hypoglycemia is the result of hyperinsulinism. This is not always easy. Moreover, after it has been determined, there still remains much uncertainty as to the lesions that will be found. When the lesion proves to be a pancreatitis or when an adenoma cannot be discovered, the advisability of partial pancreatectomy must be considered.

ALBERT F. DE GROAT, M.D.

Mallet Guy, P. Left Pancreatectomy Indications and Technique (*La pancréatectomie gauche. Indications et technique*). *J. de chir.*, 1936, 47, 771.

The operation described is an amputation of the left side of the pancreas. The amount of gland removed may be more or less, depending on the indications in the given case. The tail alone or the tail and half of the body may be removed, or a subtotal pancreatectomy, possibly with removal of a part of the head of the pancreas, may be performed.

The author describes the anatomy of the vessels with the aid of illustrations. He emphasizes that care must be exercised in the dissection of the splenic vessels and hemostasis must be perfect.

The described operation is indicated for tumors in the tail or body of the gland, cases of hyperinsulinism in which reduction of the endocrine secretion of the gland is desired, and cases of chronic pancreatitis with acute exacerbations. Three cases of chronic pancreatitis in which it was performed are reported with photographs and photomicrographs of the removed tissue.

The operation is performed preferably under general anesthesia. The patient is placed in dorso-lumbar lordosis. The surgeon stands at the right in order to be in the best position for the most difficult part of the operation, the dissection of the splenic vein and hemostasis of the upper border of the organ.

If the entire gland is to be explored, a transverse supra-umbilical incision with section of the two rectus muscles is best. The whole gland should be examined carefully for tumor even if the operation is being performed for some other indication.

The best approach to the left half of the gland is through a median epigastric or left paramedian right angled incision. Access to the posterior cavity is gained best by free section of the gastroduodenal

ligament. The pancreas is then freely exposed and the lordosis increased.

In cases of pancreatitis there may be adhesions to the spleen, and the condition of the bile ducts should be determined.

Beginning at the line where the resection is to be done, the anterior surface and lower border of the gland are dissected free from right to left, with very careful hemostasis of the small vessels. The posterior surface of the gland is then dissected free from left to right, if necessary millimeter by millimeter, special care being taken as the splenic vein is approached. This vein is always adherent and must be carefully freed throughout its length from the posterior surface of the pancreas.

The dissection is facilitated by traction on the tail of the pancreas. When the gland has been freed to the point where it is to be sectioned, a V shaped section is made and the wedge shaped cut surface is sutured with a few interrupted sutures or a continuous suture of fine catgut. The peritoneal flaps preserved in the dissection are then turned back and fixed over the sutures and the large denuded surface is covered with peritoneum.

The use of a large tampon or drain is inadvisable as there may be a copious discharge of pancreatic juice which would collect in the cavity. The best procedure is to dry the bed of the resected pancreas, fill it with the greater omentum brought up above the transverse colon, and reconstruct the gastroduodenal ligament in front of it. If there is some oozing from the spleen as the result of the freeing of adhesions, a small drain may be left.

The stump of the pancreas is fixed to the great omentum on the left and to the preserved part of the gastroduodenal ligament on the right, and is isolated from the greater peritoneal cavity by a few coloparietal sutures. The round ligament may also be used in isolating the stump. The wall may then be completely closed except around the small drain mentioned.

The steps of the operation are shown in illustrations. In the author's cases the results have always been good and there has been no severe shock. After the operation a marked increase in the blood sugar occurs. This should be watched and, if necessary, insulin should be given. If the flow of pancreatic juice is too free, it may be controlled with atropin.

The author does not know of any case in which a permanent pancreatic fistula followed a left pancreatectomy.

ALFRED GOSSE MORGAN, M.D.

Blair Bell W and Datnow M M Primary Malignant Diseases of the Vulva with Special Reference to Treatment by Operation *J Obst & Gynec Brit Emp* 1936 43 755

After briefly discussing malignant disease of the vulva and reviewing some of the literature on the condition the authors report twenty two cases of their own which were treated by operation.

They state that malignant lesions of the vulva constitute from 2 to 4 per cent of malignant lesions of the genitalia. Ninety per cent are squamous cell carcinomas. Malignancy of the vulva usually occurs after the menopause. It is not related to child bearing. Its most common sites are the clitoris and labia. Leukoplakia is generally believed to be a predisposing condition. The lesion may be papillary or ulcerative. The symptoms and signs are pruritus, swelling, the development of a lump and a bloody, foul discharge. The inguinal and femoral lymph glands are involved after a short time. Distant metastases are rare.

The results of treatment by irradiation have been very poor while those of radical surgery have been quite good. Of the authors twenty two patients ten remained well for from five to twenty years.

The operation should include resection of the superficial inguinal and femoral nodes and removal of the mons veneris, the skin and the underlying tissue of the entire vulva *en bloc*. The technique of Basset is recommended.

The authors believe that injections of lead after the operation are beneficial. They agree with others that it is wise to perform vulvectomy in all cases of long standing leukoplakia. They are of the opinion that if all cases of leukoplakia were treated effectively the incidence of vulvar carcinoma would be reduced one half. DANIEL G. MORTON M.D.

MISCELLANEOUS

Favreau M. Physiotherapeutic and Thermal Treatments of Female Sterility (Les traitements physiothérapiques et thermiques de la stérilité féminine) *Rev franc de gynéc et d'obst* 1936 31 513

The first part of this article deals with the thermal treatment of sterility. The author states that with out doubt there are many indications for the mineral water treatment of sterility but not all mineral waters are effective. First among the three groups of springs which are particularly effective are those of Salies de Bearn and Biarritz the waters of which have a high sodium chloride content and are good for the treatment of amenorrhoeic lymphatic anemic and hypothyroid women and women with a large soft bleeding uterus and cervical metritis. Second are the sulphur springs of Saint Sauveur and Caudebec the waters of which are good for women suffering from congestive conditions and nervous irritability and for arthritics and syphilitics. These waters have a beneficial effect on pelvic congestion, cellulitis, and salpingitis and regularize the endocrine functions. Third are the radio-active hot

springs of Luxeuil and Plombières, the waters of which are beneficial in cases of dysmenorrhoea, leucorrhoea, congestion of the uterus, and perimetritis and tubal infiltrations. The author cites also a number of other springs the waters of which are of value in the treatment of liver and kidney disease and high blood pressure.

Physicians at the watering places say that the treatment should be continued for at least twenty eight days. Favreau leaves the details of the treatment of his cases to be worked out by them.

The second part of this article is devoted to physiotherapy, including radiotherapy and diathermy. The most common indication for radiotherapy is fibroma of the uterus a condition which rarely causes sterility. While the rays tend to destroy ovarian function, the author has seen a patient whose menses were restored by radiotherapeutic treatment and who subsequently became pregnant.

Diathermy may be used for the treatment of sterility either alone or in conjunction with medical, thermal or surgical treatment. The two most important indications for diathermy are metritis particularly cervicitis and salpingitis particularly the gonorrheal form. In cervicitis, electrocoagulation gives the best results. The dosage is learned by experience. This method should not be used during menstruation or an acute adnexitis. Diathermy properly speaking the use of the high frequency current has a bactericidal action particularly against the gonococcus. The treatments should be short and the current of low intensity. Diathermy sometimes brings about recovery but this requires a long time—a year or more. It should be used prudently as otherwise it may be dangerous.

In some cases treatment with emanations from radio-active bodies has given good results.

ALFRED GOSS MORGAN M.D.

Chaher A. The Medical and Surgical Treatment of Female Sterility (Le traitement médical et chirurgical de la stérilité féminine) *Rev franc de gynéc et d'obst* 1936 31 385

The best treatment of sterility is prevention. Among the most frequent causes of the condition in the female are syphilis, gonorrhoea, malthusianism, provoked abortion, genital infantism, genital anomalies and infections, sclerotic ovaries, vaginal acidity, chronic cervicitis, mucous polyps, myomas and deviations of the uterus.

Genital infantism and vulvovaginitis in young girls should be treated. A prenuptial certificate of health would prevent many cases of sterility not only by preventing the marriage of persons with venereal diseases but also by revealing genital anomalies and infections which cause sterility. Physicians should advise against consanguineous marriages as they are frequently sterile. In the cases of married women the prevention and treatment of venereal disease, a diet with a sufficient amount of Vitamin E, instruction regarding proper hygiene, the principles of fertilization and the danger of induced

abortion, and treatment of vaginal acidity, chronic cervicitis, mucous polyps, myomas, deviations of the uterus, and infections of the adnexa are important.

With regard to the cure of sterility once established, some authorities are very pessimistic. The author believes, however, that at least 50 per cent of cases are curable and that this percentage would be higher if women came for treatment earlier and remained under treatment longer.

It is not sufficient to prescribe a routine treatment consisting of the administration of extracts of ovary and hypophysis, dilatation of the cervix, correction of the position of a retrodisplaced uterus, or treatment at a mineral spring. The cause must be determined in each case, and local, endocrine, general, or surgical treatment given as indicated. Endocrine treatment should consist of the administration of folliculin, lutein, or prehypophysis, depending on the type of the sterility. The general treatment may be a tonic treatment to improve the general health, treatment for syphilis, treatment for obesity, or dietetic treatment.

In local treatment, gynecological massage by the vaginal route and slow dilatation with Hegar bougies are of great value. Artificial impregnation should be used only when definitely indicated. Intubation of the uterus in cases of atresia of the os seems to deserve more attention than it has received. In some cases it may be combined with discussion of the stenotic cervix, but plastic operations have lost favor. In chronic cervicitis without infection, chemical cauterization or electrocoagulation has proved of great value, being followed by pregnancy in a high percentage of cases if the tubes are normal. In cases of suspected but not virulent lesions insufflation and the injection of lipiodol are invaluable methods of examination and in some cases have a therapeutic action by restoring the permeability of the tubes.

If these methods fail, laparotomy must be performed. It is indicated particularly in cases with

pain or dysmenorrhea, uterine retroversion, or gross lesions of the uterus or ovaries such as fibromas and cysts. In cases of uncomplicated sterility it is permissible if the husband is fertile and the sterility of the wife persists after the usual gynecological treatments, particularly insufflation or lipiodol injection of the tubes.

The operation will depend upon the conditions found after the abdomen has been opened. Myomectomy may be indicated. Hysteropexy is not only indispensable in cases of complete retroversion, but is a valuable supplement to the majority of conservative operations on the adnexa. Sclerocystic ovary, a frequent cause of sterility, may be cured by ovariolysis, ignipuncture, or subtotal resection. Operations on the sympathetic have not been found of much value in sterility, but homografts of ovarian tissue have proved successful.

Many delicate operations have been performed on the tubes with varying degrees of success. If possible, it is best to limit the intervention to salpingolysis, preserving either the whole tube or at least its pavilion and the connection between the tube and ovary. Obliteration of the pavilion which cannot be freed necessitates longitudinal or transverse salpingostomy. However, in spite of eversion of the mucous membrane this operation does not greatly favor fertilization. It is much improved by fixation of the ovary into the salpingostomy opening. In obliteration limited to the isthmus, partial resection with end to end anastomosis is usually of no value although many ingenious methods for the procedure have been devised and in some cases have been successful. Implantation of the tube into the uterus is to be preferred. Resection of a part or all of the cornua of the uterus may be necessary if they are diseased. When the whole tube must be sacrificed it is best to implant the ovary into the uterus. However, this is done to maintain menstruation and the general health rather than to insure pregnancy.

AUDREY GOSS MORCAN, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Irving, F C A Study of 308 Cases of Placenta Previa *Am J Obst & Gynec*, 1936 32 36

A study of 308 consecutive cases of placenta previa at the Boston Lying In Hospital showed a decrease in the maternal mortality from 11.6 per cent to 2 per cent and a decrease in the net fetal mortality from 47 to 20.3 per cent.

In clean cases in which the infant is alive, normal and of an estimated weight over 4 lb., cesarean section offers about an 85 per cent chance of delivering the child alive with a risk to the mother not exceeding 5 per cent. In clean cases in which the infant is dead or deformed or weighs less than 4 lb. Braxton Hicks version may be performed by the trained obstetrician at no greater risk to the mother than cesarean section. In clean cases of marginal placenta previa simple rupture of the membranes serves an extended trial. It is safe for the mother, and apparently less injurious to the child than has been supposed. In infected cases, cesarean section followed by hysterectomy is the operation of choice regardless of the condition of the child.

EDWARD L. CORNELL, M D

Dieckmann W J Blood Chemistry and Renal Function in Abruptio Placentae *Am J Obst & Gynec*, 1936 31 734

Cases of abruptio placentae may be divided into a toxemic hypertensive or vascular disease group and a non toxic group. In the majority of the former the condition is associated with a persistent hypertension rather than a true pre eclampsia or eclampsia. The hypertension may have been initiated or intensified by the pregnancy. In the non toxemic group of cases the detachment is associated with local conditions in the uterus such as subinvolution due to multiparity or infection, abnormal implantation and faulty uterine contractions. The hemoglobin and serum protein concentrations are lowered in proportion to the hemorrhage. If the loss of these substances is great enough death may occur as a result of anoxemia and improper interchange of water and electrolytes.

As a rule the hemoglobin and serum protein concentration at the time of the patient's admission to the hospital are not a true index of the volume of the hemorrhage or the patient's general condition. The systolic blood pressure at the time of admission may be more than 100 mm. and yet the patient may be in shock. The blood fibrin may be reduced to a concentration which predisposes to bleeding from mucous surfaces, incisions and the uterus. In many cases renal function is impaired but returns to normal after an interval of several months. The

tests demonstrate that chronic nephritis is not present. For the prevention or cure of the associated phenomena, the prompt, adequate and continued parenteral administration of blood and fluids is indicated.

EDWARD L. CORNELL, M D

Masson C A First Contribution to the Study of the Treatment of Feto-maternal Incompatibility by Boero's Procedure (Primera contribución al estudio del tratamiento de la incompatibilidad feto-materna por el procedimiento del Profesor Lanque A Boero) *Bolet Soc de obst y ginec de Buenos Aires* 1936, 15 9

Boero's procedure is for cases in which therapeutic abortion is indicated. It consists in the injection of from 1½ to 2 c cm of a 40 per cent solution of formalin into the fetal sac through the abdominal wall after a few cubic centimeters of amniotic fluid have been permitted to escape. The fetal movements and heart beats end during the injection. Dosages which are insufficient to destroy the embryo modify the amniotic fluid fundamentally. The dosage indicated depends upon the individual's susceptibility, the stage of the pregnancy and especially the quantity of amniotic fluid and its albumin content. The procedure simply accomplishes artificially what occurs spontaneously in maternal illnesses in which fetal death is followed immediately by cessation of the toxic symptoms although the ovum is retained. So far as Masson can ascertain from the literature, Boero's method (published in 1935) has not been used outside Argentina. He believes it deserves general acceptance.

Masson reports experiments to determine the action of formalin injected into the fetal sac, four cases (one of hyperemesis gravidarum, three of tuberculosis) in which Boero's procedure was carried out with successful results and Friedman's reaction was studied, and histological researches on animal and human embryos.

Formalin injected through a laparotomy incision into one horn of the pregnant uterus of rabbits and guinea pigs caused rapid fetal death. The ovum was retained for several days. The correct dosage (usually 1 c cm of a 1 per cent solution) produced a purely local action on the ovum. Excessive dosage caused hemorrhage into the uterine wall. The fetuses in the untreated horn developed normally and were born alive. Masson believes that his experiments are the first in this field, the only ones which are at all comparable being those of D'Amour and Kiven.

The fetal lesions were uniform and characteristic: an intense dermatitis with desquamation, coagulation necrosis of the internal organs, rapid atrophy of the chorionic villi and thickening of the amnion.

The most typical effect was in the vascular system of the skin. This consisted of an intense congestion with hemorrhage due to rupture of the vessels, or of tissue infiltration with red corpuscles and plasma, the vessels remaining intact. Apparently, the violent peripheral congestion, combined with the well known action of formalin on the nervous system causes cardiac collapse. Formalin fixation of the amniotic sac reduces the ovum to a closed, isolated cavity. Feto-maternal interchange therefore ceases more quickly than after natural death of the fetus.

Friedman's reaction became negative between the third and fifth days after the treatment although the ovum was sometimes retained much longer. Therefore Boero's procedure is a quick method of determining fetal death. The latter had no connection with the onset of the milk secretion, which was closely related to the expulsion of the fetus.

Masson concludes that Boero's method is superior to all others for the induction of therapeutic abortion. It is based on a new concept in that it is directed against the ovum and limited to it, whereas all other methods act primarily on the uterus. It involves minimal disturbance, traumatism, and risk, and safeguards against infection. The rapid elimination of the toxic factor allows immediate and undivided concentration on the restoration of the mother. Retention of the dead ovum produces no disturbance. The abortion is always complete and often *en bloc*. As the follow-up of the author's patients proved, the procedure has no sequelæ and the normal anatomy and functions of the genital tract are preserved.

In the discussion of this report TALLAFERRO cited eight cases of his own which confirmed the results of Boero and Masson, and stated that in three cases in which methylene blue was injected into the fetal sac after the procedure the dye did not appear in the urine.

SCHWARZ reported four cases of tuberculosis in which the procedure was beneficial.

The article is illustrated with colored plates and photographs.

M. E. MORSE, M. D.

Stoeckel, W. The Problem of Pyelitis of Pregnancy (Zum Problem der Schwangerschaftspyelitis). *Zentralbl. f. Gynæk.*, 1936, p. 441.

According to present day opinion, pyelitis gravidarum is a system disease involving, more or less, all parts of the urinary system. The descending course of the infection, from the kidney to the urethra, is determined and explained by the direction of the flow of the urine. However, the theory that the infection travels against the urinary stream, and the possibilities and conditions cited in support of this assumption are less clear. The immediate proximity of the ascending colon to the right kidney pelvis gives rise to the possibility of a primary, isolated infection of the pelvis of the right kidney by way of the lymph stream or by contiguity. Appendicitis beginning with pyelitis also suggests a lymphogenic migration of bacteria. The author he-

lieves that in pyelitis gravidarum the infection travels more frequently by the descending route from the intestine through the kidney to the renal pelvis than by the ascending route, from the bladder to the renal pelvis. He assumes that both types of infection take place by way of the lymph or blood stream.

As the ascent of bacteria is opposed by numerous effectual barriers, even in the bladder sphincter alone, ascending (intracanalicular) infection is rare even when the force of the outflow of urine is reduced as it is especially in the last months of pregnancy. The flow of the urine through the ureters and the exactly functioning sphincter mechanism at the ostia of the ureters bar the way upward completely. In the studies of the author and of Frommelt a vesico-ureteral reflux was never found. Equally infrequent is the transportation of bacteria from the renal pelvis into the kidney itself. The studies of Krause and, supplementary thereto, the work of Schueler, Bauereisen, and Cumston, demonstrated that there is a close lymphovascular interrelationship between the various parts of the urinary apparatus. The excellent results of antiseptic treatment of the vulva in cases of masturbation, defloration, and cohabitation pyelitis indicate that lymphogenic or hematogenic transportation of the infective organism may occur from the external genitals when they are injured. According to present day opinion regarding this problem, the ascending infection is of a hemolymphogenic nature. That in descending infection the bacteria migrate from the easily permeable intestine into the blood stream is not to be doubted. This explains why high enemas have such a beneficial effect on pyelitis. It explains also the fact that the infection of the urine is not the decisive factor since even a marked bacteriuria may be present without "inflammation" (as in one of the author's cases).

On the other hand, the passage of the pyelitis producing organisms through the kidney without infecting the latter is still unexplained. Clinical observations have demonstrated that pyelitis frequently develops without primary injury of the kidney. More exact knowledge concerning secondary renal involvement, which in the course of the condition may occur on the normal and diseased side, must be obtained from further study. It is certain that urinary stasis plays an important role in the virulence of the infection. This stasis is due chiefly to mechanical hindrances which arise especially toward the end of pregnancy and interfere with the normal flow of the urine. The enlarging body of the uterus presses on the ureter, causes it to kink, and narrows its lumen, thereby leading to retrograde urinary stasis. The consequent dilations of the ureter have been demonstrated clearly by retrograde and excretory urography, but are not to be considered pathological in themselves.

The excellent studies of Fuchs concerning the theory of the function of the urinary passages (based on the work of Trendelenburg on peristalsis

as a tonus problem") demonstrate clearly the functional segmentation of the urinary passages (the bladder as well as ureters) into sections with a lowered tonus (detrusor) and sections with an increased tonus (sphincter). By this means the peristalsis of the ureter and, thereby, the transportation of its contents are assured. In the normal secretion of urine the undifferentiated muscular tube of the ureter is made up of successive detrusor and sphincter sections running in the direction of the urinary flow, and first one section and then the other exerts its function. Each combination of detrusor and sphincter segment makes up a 'secondary bladder' (cystoid). The ureteral dilatations are therefore not pathological.

According to Stoeckel the arrangement of the cystoids in the ureter is determined by embryological narrowings of the ureter and pathological sites of fixation developing subsequently. Both types of narrowings differ in different ureters. An important role in the development of the fixation sites is played by the narrow zone of tissue surrounding the ureter and containing the nerves, ganglia, arteries and veins supplying it which the author calls the 'mesurette'. Stoeckel believes that the sites of fixation of the ureter are the result chiefly of mesoretal infiltration due as a rule to invasion through the ureteral mucosa, dissemination by way of the lymph or blood stream from an external focus or the contiguity of a neighboring diseased organ. Likewise temporary post-infectious infiltrations (occurring after appendicitis or adenitis in cases of ureteral fistula and in cases of focal infection or intestinal infectious processes) determine these mesoretally developing sites of fixation and thereby the location of the cystoids. However, as long as the dilatations above the sites of fixation produce a compensatory muscle hypertrophy, there is nothing pathological about the condition. These mechanical dilatations of the ureter are not sufficient in themselves to explain the development of pyelitis of pregnancy.

In the author's opinion the condition becomes pathological that is injurious to ureteral function during pregnancy only when in addition to the mechanical hindrance to the flow of the urine there is a toxic or hormonal (corpus luteum) injury. As is known from the work of Mirabeau, hyperemia and occlusive swelling of the ureteral lumen leading to urinary stasis occur during menstruation. That pregnancy exerts an identical influence on the ureter is demonstrated by the association of ileus of pregnancy with pyelitis. The abdominal organs supplied by the sympathetic nervous system (the intestines, uterus, bladder and ureters) are rendered hypotonic by the pregnancy. The author therefore concludes that the pyelitis of pregnancy cannot be regarded as a chance complication induced by the fortuitous entrance of a pus-producing organism into the urinary tract. In its typical form it is a complication of the pregnant state induced by the pregnancy itself, which is to be classified with such

toxic complications as hyperemesis and eclampsia and presents a problem of tonus. The disease varies in its severity. It may result in a condition of the utmost gravity or may be combined with other organic insufficiencies caused by a pregnancy toxemia. In the diagnosis too much importance should not be attached to the dilatation and looping of the ureter as criteria of the severity of the functional disturbance since, as suggested by Fuchs, these phenomena may be the expression of compensatory hyperactivity. In the frequently difficult differential diagnosis between pyelitis and appendicitis the uroscopic demonstration of dilatation of the ureter should not be interpreted as definitely excluding the possibility of appendicitis.

The author emphasizes the importance of early treatment and careful, skillful, adequate management of the renal pelvis (by ureteral catheterization, irrigation of the renal pelvis, or the use of an indwelling renal catheter). As a rule this will assure recovery without interruption of the pregnancy. Of great importance in the determination of the treatment to be given is advance of the infection from the renal pelvis to the kidney itself. When this occurs the author advises a surgical attack on the diseased kidney, as the operation is no more dangerous during pregnancy than at other times and interruption of the pregnancy is thereby avoided. He believes that weak doses of roentgen irradiation of the kidney are very beneficial. However, as they are dangerous to the child they are not to be considered during pregnancy.

On the basis of these considerations Stoeckel has devised a combination treatment for pyelonephritis gravidarum and divides the cases into two groups—those in which the pyelonephritis is the only complication of the pregnancy and those in which it is associated with other organic insufficiencies of toxic origin. In the first group early, local conservative surgical treatment will alleviate the pyelitis, and if the nephritis continues after delivery roentgen irradiation of the kidney may be done. In the cases in which the pyelitis is combined with other organic insufficiencies of toxic origin the danger is such that interruption of the pregnancy must not be delayed too long. After interruption of the pregnancy the treatment is identical with that given to the first group.

In the inclusion of the kidney in the determination of the indications and treatment Stoeckel sees considerable therapeutic progress. Whether chills denote dissemination of the infection from the renal pelvis to the kidney or, as is common in other disease pictures, invasion of the blood stream, has not been definitely determined. At any rate chills or even a number of sharp rises in the temperature reacting unfavorably on the effects of treatment portend immediate danger and in the author's opinion indicate surgical interference. The aim of therapy in pyelitis is preservation of the pregnancy and the kidney.

(H. FUCHS) JOHN W. BRENNAN, M.D.

Baird, D. The Upper Urinary Tract in Pregnancy and the Puerperium, with Special Reference to Pyelitis of Pregnancy. V. Infection of the Upper Urinary Tract in the Puerperium. *J Obst & Gynec Brit Emp*, 1936, 43: 435

The reported investigation was made at the Glasgow Maternity and Woman's Hospital. Baird states that infection of the urinary tract in the puerperium is exceedingly common. It may be due to the persistence of a urinary infection of pregnancy or to infection developing in the puerperium.

Of 3,600 deliveries, urinary infection was the cause of puerperal pyrexia in 12.3 per cent. Of 670 urine specimens obtained by catheterization in the puerperium, infection was evidenced by the presence of pus cells and organisms in 27.1 per cent.

The importance of taking a catheter specimen of urine in the cases of all women admitted to the hospital in labor was recognized early since frequently when the urine was heavily infected there were no symptoms, either urinary or general. Albuminuria occurred in 418 (62.4 per cent) of the cases. As a rule it was only a transient phenomenon of labor. In 77 (67 per cent) of the 115 cases in which pus cells and organisms were present in the urine there were no urinary symptoms. In many of the cases in this group the infection was slight, but even in 33 (50 per cent) of the 64 cases in which the infection was severe there were no urinary symptoms, and in 28 (43.7 per cent) of the cases of severe infection there were no symptoms to suggest a septic focus. In the whole series of 2,175 cases the findings were similar and resembled those in cases of urinary infection in pregnancy, in which also absence of symptoms was a striking feature.

In the puerperium the organism is much less frequently coliform than during pregnancy. Of the cases of severe infection, coliform organisms were cultured in 57 per cent, whereas of those of slight infection they were cultured in only 23 per cent. Of the latter group, staphylococci were seen on the films and obtained in cultures in 69.2 per cent. In the antenatal period staphylococci are seldom found in the urine.

In the cases of noteworthy pyrexia the incidence of marked urinary infection was 11 per cent after spontaneous delivery and 36.5 per cent after complicated delivery, whereas in the non febrile cases the corresponding percentages were 3.7 and 16.8. The occurrence of urinary infection in the puerperium appears to be influenced by complicated delivery and associated with pyrexia, but it is important to remember that primary urinary infection may be present in a non febrile puerperium.

In cases of infection of the urinary tract in the puerperium, pyrexia occurring within three days after delivery is due to (1) prolongation of the pyrexia of a pyelitis of pregnancy, (2) the exacerbation of a chronic pyelitis of pregnancy, in which case temporary invasion of the blood stream by the organisms is the usual cause, or (3) the presence in the blood stream of organisms derived from the bowel.

In this group the urine is sterile before delivery but becomes infected. These are cases of septicemia, but they usually result in pyuria. Pyrexia developing between the eighth and the tenth days may be due to (1) the exacerbation of a chronic pyelitis of pregnancy, which is rarely the case, (2) invasion of the blood stream by organisms derived from the bowel, or (3) primary infection of the urinary tract, probably by the ascending route from the bladder. When it is due to the second or third cause the urine is sterile before delivery.

Treatment on general lines with the administration of abundant fluid and of alkalies is efficient in the acute stage of all three types of cases, but to render the urine free from infection different measures are required in each type. The cystoscopic findings in the puerperium are entirely different from those in pregnancy. During pregnancy there is delay in emptying of the upper urinary tract with efficient emptying of the bladder, while in the puerperium the delay in emptying of the upper urinary tract quickly disappears but retention of urine in the bladder is frequent. (Of the reviewed cases, residual urine was found in 17 per cent on the eighth day after delivery.) Accordingly, during pregnancy there is gross infection of the upper urinary tract with little or no infection of the bladder, while in the puerperium the conditions are reversed. In cases with marked pyrexia the renal urine contains a few pus cells and organisms while the bladder contains abundant pus cells and organisms and several ounces of residual urine. Difficulty is experienced in obtaining good visualization of the bladder and the ureteral orifices because of the widespread injection and edema of the base of the bladder, a condition which seldom occurs during pregnancy. These findings are in agreement with the clinical features, namely, the prominence of renal symptoms in the acute stages of the pyelitis of pregnancy and the absence or transient nature of renal symptoms in the pyelitis of the puerperium. The absence of vesical symptoms in pyelitis of the puerperium is explained by the lack of sensitivity of the bladder in the puerperium.

In the reviewed cases of septicemia, although the pyrexia lasted for more than a fortnight in 28 per cent, the patients did not look ill and the evening rise of temperature was practically the only symptom. After the temperature decreased the urine was still heavily infected, but on cystoscopic examination the infection was found to be confined almost entirely to the bladder. In some cases there were several ounces of residual urine, and daily catheterization until this had disappeared was found to be of great aid in clearing up the infection. Although many of the patients still had pus cells and organisms in the urine when they were discharged from the hospital, only 2 of 30 had any urinary infection when followed up at the end of two years. Both of these had bacilluria. Eleven patients had had a subsequent pregnancy without infection of the urine.

If primary pyelitis of the puerperium is to be regarded as an ascending infection from the bladder,

treatment should be directed first to the bladder. According to Randall and Murray, pyelitis of the puerperium may be prevented by catheterizing the bladder in all cases in which the patient is unable to pass urine twelve hours after delivery, and repeating it daily until there is no residual urine. In their opinion the infection of the bladder and the resulting ascending infection are due to stasis of urine in the bladder. In Scotland, however, it is generally believed that because of the danger of introducing infection with the catheter, catheterization should be done only as a last resort. In the author's opinion prophylaxis by early catheterization of the bladder in the puerperium is worthy of a trial, as by the present methods gross infection of the bladder occurs in 11 per cent of all cases of delivery. Randall and Murray claim to have eliminated pyrexia due to urinary infection in a series of 3,500 puerperal cases by early catheterization of the bladder. For pyelitis of the puerperium Walther and Willoughby advocate ureteral drainage either by repeated lavage or by the use of an indwelling catheter. They favor this treatment because in 13 cases in which it was employed the temperature was reduced to normal in from one to eighteen days. However pyrexia in pyelitis of the puerperium seldom persists any longer than that when medical treatment is given. The author doubts that there is need for ureteral drainage as in the cases he reviews there was very little stasis in the ureters.

When the pyrexia is due to an exacerbation of the pyelitis of pregnancy it usually lasts only for a few days when medical treatment is given, but in a large percentage of the cases the urine remains infected for months or years in spite of strenuous local treatment such as repeated renal lavage.

J. THORNWELL WITHERSPOON, M.D.

Trillat P. and Contamin R. The Effect of Manipulations to Cause Abortion on the Development and Prognosis of Extra Uterine Pregnancy (De l'influence des manoeuvres abortives sur l'évolution et le pronostic des grossesses extra utérines) *Gynec et obstet* 1936 33 401

The authors report seven cases of extra uterine pregnancy in which the woman attempted abortion and review twelve cases from the literature.

In the majority of the authors' cases the attempt to induce abortion was made by intra uterine manipulations with a sound. In some these manipulations were followed by the injection of fluids. As a rule such attempts do not cause immediate rupture of the extra uterine pregnancy. In fact, there have been numerous reports of cases in which even curettage on a mistaken diagnosis of intra uterine pregnancy did not terminate the extra uterine pregnancy. The attempt at abortion generally results in an infection which hastens rupture of the tube and renders the prognosis very much more unfavorable. A characteristic feature is a free interval of varying length between the immediate symptoms caused by the attempt to induce abortion and the symptoms caused

by the rupture of the pregnant tube. As a rule the patient is not seen in the first stage. The symptoms improve without treatment, but the woman continues to have pain in the abdomen and fever until the tube ruptures. It is in this second stage the stage of rupture, that it is important for the obstetrician to know that an attempt at abortion has been made as otherwise he may treat the case as one of ordinary extra uterine pregnancy and close the abdomen without drainage. Because of the existing infection, such treatment is apt to prove fatal. When signs of infection are noted and the woman will not admit that abortion has been attempted, careful inquiry should be made as to whether there have been two periods of symptoms separated by a free interval. If evidence of attempted abortion is elicited a Mikulicz drain should be used. After eleven days this should be removed and replaced by an ordinary drain.

The mortality in cases of extra uterine pregnancy in which abortion is attempted is high. In the authors' cases it was 43 per cent.

AUDREY GOSS MORGAN, M.D.

LABOR AND ITS COMPLICATIONS

Levy Solal, E., and Sureau, M. The Barbiturates in Obstetrics (Les barbituriques en obstétrique) *Ines et Inal* 1936 2 103

The authors review the literature on the obstetrical use of diethyl hypnol nembutal, sodium alurate, amylal, somnifene, evipan, pernocton, numal, and retidon and report their experiences with the use of barbiturates in ninety deliveries. In studying the influence of the barbiturates on the contractions of the uterus they used an apparatus called a toceto graph which consists essentially of a large pneumatic pouch connected with a polygraph.

From their findings they conclude that doses of barbiturates capable of producing complete anesthesia have such a marked effect on uterine contractions that they should be used only toward the end of the period of dilatation. They prefer drugs which do not produce true anesthesia and do not seriously influence the course of labor.

MARSH W. POOLE, M.D.

PUERPERIUM AND ITS COMPLICATIONS

Settergren F. The Danger of Infection in Catheterization of the Bladder, and the Indications for Catheterization in Obstetrical Cases (Ueber die Infektionsgefahr bei Katheterisierung der Harnblase und ueber die Indikationen zur Katheterisierung in obstetrischen Faellen) *Acta obst et gynec Scand*, 1936, 16 202

The author first presents a review of the various complications which may follow catheterization of the urinary bladder. In order to determine the frequency of urinary infection due to catheterization, he made a study of the obstetrical cases in the South Obstetrical Hospital in Stockholm. At the same

time he investigated the indications for catheterization of obstetrical patients

The material included 400 cases which were equally divided into 2 groups. In Group 1 were those in which catheterization was done at least 3 times before the patient was discharged from the hospital, the catheter being passed after external washing with sterile water and without the use of an antiseptic. In Group 2 were those in which catheterization was done on the basis of definite indications and always with the use of an antiseptic. At the time of the first catheterization and also when the patients were discharged, urine specimens were taken for bacteriological examination.

The incidence of infection of the urinary tract apparently occurring in the hospital was 29.2 per cent in Group 1 and 12.2 per cent in Group 2. If the incidence is calculated only for the cases in which pus cells were formed, the corresponding figures are 20.5 and 5 per cent. For various reasons the author believes that the difference between the percentages for the two groups was actually somewhat greater.

Apparently obstetrical infection did not predispose to associated infection of the urinary tract. The frequency of obstetrical infection usually increased with the length of the time interval after rupture of the membranes, but was little influenced by the duration of labor. In the incidence of urinary infection the reverse was true. Obstetrical operations were performed in so few cases that no conclusions as to their relationship to urinary infection could be drawn.

Even antiseptic catheterization was associated with danger, but the danger was greater in catheterization without the use of antiseptics. The incidence of urinary infection seemed to increase with the number of catheterizations.

In the cases of Group 2 the indications for catheterization for urinary retention as well as to obtain a specimen of urine for examination were

more strictly limited. The frequency of catheterization for retention was about the same in both groups of cases, but catheterization for the removal of a specimen of urine for examination was done in 31 cases of Group 1 and only 1 case of Group 2.

The ages of the patients had no influence on the frequency of urinary infection. However, primiparas developed a urinary infection more frequently than multiparas. The former, who usually had more prolonged labors, were catheterized about twice as often for retention as the latter.

Only a few of the patients developed subjective symptoms and only 1 developed a complication, viz., pyelitis.

Bacteriological examination showed no marked difference between the groups as regards the nature and action of the bacteria.

As further evidence that catheterization should be based on strict indications in obstetrical cases, the author states that probably more than 150 patients in Group 2 who were not catheterized were able to urinate spontaneously even during labor before the delivery of the child, and that only 32 patients in all required catheterization for retention during labor or the following twenty-four hours. In a comparison of the groups with regard to the time of expulsion of the placenta and the amount of bleeding it was found that limitation of the number of catheterizations did not reduce the ability of the uterus to contract.

Re-examinations after from two to four weeks showed a not inconsiderable tendency of urinary infection to become cured spontaneously. However, as urinary tract infection is always associated with the danger of serious complications, every attempt should be made to prevent such infection. The author believes that the great majority of obstetrical patients may be given urinary antiseptics for prophylaxis. He describes a new type of urinal which he has devised for the collection of urine specimens in the cases of females.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Everett H S Reduplication of the Renal Pelvis and Ureter *J Urol* 1936 36 1

Everett tabulates forty eight cases of reduplication of the renal pelvis and ureter and reports one case in detail. In a study of the differential function of the various renal segments in this condition he found that in the absence of complicating pathological lesions the function of the two sides is usually about equal. On the reduplicated side the function of the lower segment usually exceeds that of the upper segment in the ratio of about 2:1.

He states that in the conservative treatment of reduplication of the renal pelvis and ureter ureteral dilatation is of value. FRANK M COCHENS, MD

Gouverneur R and Cachin C Surgical Treatment of Ptosis of the Kidney. Indications. Technique. Results. (*Le traitement chirurgical des ptoses rénales. Indications technique résultats*) *J de chir* 1936 47 754

Operation for ptosis of the kidney, which was performed frequently for a time but later abandoned, has again come into favor since modern methods of examination of the kidneys have established more accurate indications for it. Pyelography and intravenous urography and a better knowledge of the physiology of the renal pelvis and ureter have helped to explain and prevent the poor results of nephropexy.

In cases of prolapsed kidney with pain an operation performed without study of the morphological changes in the pelvis and ureter and without examination of the kidney for infection is apt to be unsuccessful. Operation for this condition should always be preceded by retrograde ureteropyelography with the patient standing. This is the position in which pain occurs and which shows the true position of the kidney, the shape of the pelvis, and the site of any ureteral kinks that may be present. The indications for operation should be based also on clinical observation continued for a sufficiently long time, and on bacteriological examination of the urine. In some cases a functional examination of the kidneys should be made in addition.

In the past operations for ptosis of the kidney were often insufficient. Mere fixation, as suggested by the name nephropexy, is not enough. The kidney must be placed in a reconstructed bed. The operation indicated is therefore a reposition rather than a fixation. The authors fix the kidney in position and form a small suspensory hammock for its lower pole from the perirenal fat and the lower part of the renal fascia. This procedure is a slight modification of the Papin method. The steps of the

operation are described in detail and illustrated, and the condition before and after the operation is shown by roentgenograms.

The authors have performed this operation in twenty eight cases of floating kidney with marked functional disturbances. Retrograde pyelography or ureteropyelography was done in twenty three cases and intravenous urography in five. One or two months after the operation the results were verified by pyelography. The anatomical results were excellent. The kidney was restored to its normal position and the kinks in the ureter had disappeared. The pain was stopped completely, in all but four cases, and in the latter was much less severe than before the operation. The attacks of kidney strangulation which occurred in some of the cases had ceased. Most of the patients were able to resume their work. The digestive disturbances were cured or relieved. The general condition was improved, the appetite had been restored, and the patients had gained weight.

In conclusion the authors state that successful results depend particularly on correct indications. While the operation requires skill and care, it is very simple. ALFRED GOSS MORGAN, MD

Lewis E C The Pelvic Ureter in Women. Effects of Gynecological Lesions. *Brit J Urol*, 1936, 8 132

Lewis divides the ureter into three parts. The first part extends from the brim of the pelvis to the broad ligament of the uterus. As examples of abnormality in this part pelvic peritonitis and operative injury are cited. The second part is that related to the uterus and large vessels. Here, parametritis, calculi and carcinoma may cause symptoms. The third part is that related to the bladder and vagina, which may be injured in operative procedures. Illustrative cases are reported.

DONALD K HIBBS MD

Di Maio G Endoscopic Ureteropelvic Drainage in Certain Septic Surgical Ureteropelvic Renal Conditions (*Il drenaggio ureterico pelvico endoscopico in alcune affezioni chirurgiche settiche uretero-piela-renali*) *Arch ital di urol*, 1936, 13 397

In reviewing the literature Di Maio found that ureteropelvic drainage with the bladder opened was done first by Kelly in 1885. Following the introduction of cystoscopy, endoscopic ureteral catheterization was done by Albarran as the treatment of choice first in pyelonephritis and later in cases of ureteral stones.

From a study of endoscopic ureteropelvic drainage in sixty-eight cases Di Maio draws the following conclusions:

1 In ureteropyelitis due to such causes as mobility or ptosis of the kidney or ureteral stones causing hematuria, to which the ureteropelvic toosis is still sufficiently maintained, endoscopic ureteropelvic drainage is followed by rapid and definite cure

2 In forms of suppurative nephritis not easily differentiated from simple pyelitis, negative results of ureteropelvic drainage constitute an important diagnostic sign permitting the surgeon to perform a conservative operation (decapsulation and lumbar drainage) before the patient's condition becomes worse and follow it by radical operation at a later date

3 Hematuria caused by hydronephrosis with renal ptosis is stopped by the use of an indwelling ureteral catheter

4 In pyelitis with contralateral pyocephrosis and mild hydronephrosis with severe contralateral hydronephrosis, unilateral or bilateral ureteropelvic drainage improves the general condition and cures the pyelitis or, by relieving the hydronephrosis, permits radical operation for the pyocephrosis and conservative treatment of the hydronephrosis

5 In hydronephrosis due to ureteral stones, ureteropelvic drainage, if it is possible, relieves the septic condition and favors a normal post-operative course following ureterolithotomy or ureteronephrectomy

6 In inoperable conditions such as bilateral hydronephrosis with stones, ureteropelvic drainage is always followed by improvement

7 In bilateral hydronephrosis of gynecological origin in which surgical intervention is contra-indicated, ureteropelvic drainage always yields better results than surgical drainage

8 There seem to be no untoward reactions or complications attributable to ureteropelvic drainage even when the drainage is maintained with the same catheter over periods ranging from one to seven days and is repeated several times in a period of months. Neither do there seem to be any definite limitations or contra-indications to the procedure, since in severe inoperable suppurative forms it may be used for alleviation, and in milder pyelo ureteral inflammatory processes it gives good results when more commonly used measures have proved ineffective

RICHARD C. SOMMER, M.D.

Riba, L. W. Ureterocele With Case Reports of Bilateral Ureterocele in Identical Twins *Brit J Urol*, 1936, 8 219

Riba reports eight cases of ureterocele and describes the method of treatment employed. The article is noteworthy for the excellent plates and for the description of the electrical urethrotome devised by the author. The occurrence of ureterocele in identical twins inclines Riba to the view that at least in some cases the condition may be congenital in origin. In two cases, metaplasia of bladder epithelium overlying the ureterocele was noted.

The diagnosis is made by cystoscopy supplemented by intravenous pyelography.

Riba favors meatotomy or dilatation for the collapsible type and transurethral resection for the non collapsible type. DONALD K. HIBBS, M.D.

BLADDER, URETHRA, AND PENIS

Longacre, J. J. The Treatment of Contracted Bladder with Controlled Tidal Irrigation *J Urol*, 1936, 36 25

Longacre gives a preliminary report on three cases of contracted bladder treated by tidal irrigation. He believes that this type of treatment is particularly suitable for the small, contracted, fibrosed bladder resulting from prolonged chronic cystitis. For paralytic bladders he employs the tidal drainage principle used by Monroe and Hahn. The apparatus fills the bladder to a predetermined height of intravesicular pressure and empties it completely at intervals by a combination of siphonage and gravity flow without interfering with the normal bladder contractions. The slow application of pressure decreases the danger of ureteral reflux as well as danger to the bladder wall. FRANK M. COCHENS, M.D.

GENITAL ORGANS

Owen, S. E., and Cutler, M. Sex Hormones and Prostatic Pathology *Am J Cancer*, 1936, 27 308

After reviewing the literature the authors describe their method of extracting the sex hormones from the urine. They determined the content of estrogenic hormones in the urine in twenty two cases, twelve of which were cases of prostatic involvement. In eight of the latter, the condition was diagnosed clinically as carcinoma of the prostate and in four as benign prostatic hypertrophy. In the cases of prostatic disease the urinary output of estrogenic substances did not show much variation from the normal. Biological assays for the prolans showed no imbalance of the sex hormones in malignant or benign prostatic involvement.

DONALD K. HIBBS, M.D.

Smith, G. G. Total Perineal Prostatectomy for Carcinoma *J Urol*, 1936, 35 610

The author states that only occasionally is the diagnosis of carcinoma of the prostate made sufficiently early to justify an attempt at radical cure. It may be said with considerable accuracy that in many cases the part of the prostate which is palpable by rectum is the first to become malignant. If prostatic malignancy is suspected on rectal examination, the prostate may be exposed perineally and a piece removed for frozen section. If the diagnosis is cancer, the operation may be completed by the perineal route. When malignancy is not suspected and the suprapubic route has been chosen, the adenomatous lobe is enucleated and the carcinoma is missed or is enucleated only with great difficulty. When carcinoma is found on exploration by the suprapubic route the best procedure is to drain the bladder and attack the gland later by the

perineal route. Of fifty cases, the author was able to plan the operation beforehand in forty three.

After making the diagnosis the surgeon must decide whether total prostatectomy is feasible. Because of the time required by the operation advanced age is a contra indication. A frail old man or one with a serious cardiac disease should not be operated upon. The kidney function should be restored to the maximum either by catheter or by suprapubic drainage. Excessive renal damage is a contra indication to operation. The size of the gland and the extent of the induration should be determined by manual examination with the patient lying on his back. If the induration extends downward to the perineum the apex of the prostate cannot be freed without cutting through malignant tissue, which would result in local recurrence. Laterally, the gland should be separated from the pelvis by a sulcus. If this is not the case, the growth has broken through the capsule. The anterior rectal wall should be movable upon the prostate. Finty means extracapsular involvement posteriorly. If the vesicles are definitely indurated and adherent to the pelvic walls they are probably involved. Under such conditions their removal is impossible. However a slight degree of finty is not a contra-indication to operation. The upper edge of the gland should be palpable with the soft bladder base above it. If these criteria are met and cystoscopy shows no evidence of eruption of the growth through the trigone total prostatectomy may be attempted.

The technique used by the author is that described in Young's Practice of Urology.

Unless vasectomy is done epididymitis may develop as a complication. Rectal fistula should not occur but occasionally does. The moment of greatest danger is when the rectum is freed from the apex of the prostate before the tractor is inserted. There is danger also during the placing of the sutures in the edge of the levator ani when the perineum is repaired. The inclusion of a fold of rectum in the stitch will be followed by sloughing.

In the author's fifty cases there were five hospital deaths. The length of stay in the hospital varied from two to over eight weeks. Six patients developed a constriction at the point of union of the urethra and bladder. Occasional dilatation was required but the condition seemed due to scar tissue outside of the urethra rather than true stricture. Even the patients treated for recurrence were remarkably free from symptoms of obstruction. Occasionally urinary control is acquired as soon as the catheter is removed but as a rule more or less re-education of the sphincter is necessary before it will work automatically.

Of the author's forty five patients who were discharged from the hospital twenty five died of cancer after three years. Six of these lived for more than five years and five for more than nine years. Of the patients dying of their disease eleven had definite vesicular involvement at the time of the operation. Six patients died of intercurrent disease

without symptoms of recurrence. Fourteen are still alive and well.

In conclusion the author states that prostatic carcinoma would be diagnosed early more frequently if a routine rectal examination were made of every male patient over fifty years of age. Suspicious induration of the prostate should be investigated by needle biopsy or by perineal exposure of the prostate for the surgical removal of a biopsy specimen. In every medical center at least one surgeon should be trained in perineal surgery.

LOUIS NEWELL M D

Deutsch I Tumors of the Spermatic Funiculus (Ueber die Geschwuelste des Funiculus Spermaticus) Boergyrgy Semle 1935, 23 93

The tumors of the spermatic cord are of heterotopic embryonal origin or arise from the tissues (Rubaschow). From the standpoint of origin, those of the first group are of special interest. Dermoid cysts like ovarian dermoids, are of ectodermal origin. During its descent the testis carries with it particles of ectoderm which may later cause tumor formation. The mesodermal heterotopic tumors arise from misplaced mesodermal rests. In the literature twenty seven cases of such tumors are reported. The majority of the neoplasms were malignant. The cysts with cylindrical epithelium occurring along the spermatic cord have their origin in the wolffian bodies.

Of the tumors arising from the tissues of the spermatic cord, the most common is the lipoma. Fifty seven cases of such lipomas have been recorded.

Neoplasms developing from the connective tissue about the spermatic cord, the tunica vaginalis communis, the remains of the propra, or the connective tissue immediately surrounding the vas deferens are usually fibromas. Twenty four cases are reported.

Up to the present time the literature has recorded 184 cases of definitely diagnosed tumors of the spermatic cord, including the author's case of fibroma. The most common tumors are lipomas, fibromas and sarcomas, and the next most common dermoids and wolffian cysts.

All of the tumors are neoplasms of maturity. Lipomas usually occur between the fortieth and fiftieth years of age and fibromas between the thirtieth and fortieth years. The author's case of fibroma was an exception as the patient was only twenty-one years old.

The tumors are located in the scrotal sac or in the inguinal canal, or between both along the spermatic cord. The sarcomas usually begin in the scrotal part of the spermatic cord grow upward and may penetrate through the inguinal canal into the pelvis. Mixed tumors occur usually near the epididymis as the embryonal rests from which they arise are usually in that region. The cysts also are usually located in that region. Connective tissue cysts have been observed only in the inguinal canal, they have never

been found in the scrotum. In general they range in size from that of a nut to that of an apple. Lipomas and fibromas often reach a considerable size.

The form of these tumors is usually round or oval. Sarcomas are most frequently pear shaped, and cysts are irregularly round. In consistency, the lipomas are soft. Fibromas have a certain stiff elasticity unless they are calcified, when they are stone hard. Sarcomas are also hard, like cartilage, but may contain soft and fluctuating portions. Cystic tumors are usually soft and show fluctuation. The tumors may be moved with the spermatic cord or along it.

Small tumors, malignant as well as benign, are usually symptomless. Large tumors cause pain which is of mechanical origin. Malignant tumors (carcinomas, sarcomas, and mixed tumors) form metastases very late and infiltrate the neighboring lymph nodes comparatively late. Malignancy is suggested first by rapid growth.

There is no characteristic clinical course. The role of trauma is not entirely clear.

At first, mixed tumors grow very slowly, but after a certain time they increase in size remarkably fast. This characteristic is practically pathognomonic. In the differential diagnosis of neoplasms of the scrotal part of the spermatic cord, tumors of the testis, the epididymis, and the scrotum must be ruled out. The tumors located in the inguinal canal may be difficult to differentiate from hernia, especially irreducible inguinal hernia.

The only treatment to be considered is operative removal with the greatest possible preservation of the spermatic cord and testis. Of particular importance is careful hemostasis for the prevention of post-operative hematoma. If there are extensive adhesions it may be necessary to resect the vas deferens. In cases of malignant tumor, castration on the affected side is necessary; the spermatic cord should be resected as high as possible. If the tumor is located partially in the inguinal canal, the latter should be closed after its removal in the manner customary after inguinal herniotomy.

Benign tumors of the spermatic cord usually do not recur. Lipoma is an exception. Malignant tumors recur very frequently. When the recurrence is rapid, the condition usually soon terminates in death.

(E. LILLES) JACOB E. KLEIN, M.D.

MISCELLANEOUS

Wright, B. W. Urinary Complications in an Epidemic of Poliomyelitis. *J. Urol.*, 1936, 35, 618.

The literature contains little reference to the urinary complications of poliomyelitis, which apparently may be more frequent and more important than is generally believed. This paucity of reference to involvement of the urinary tract is explained by the infrequency of urinary complications in previous epidemics as compared with the more recent ones. In the 1934 epidemic the urinary disorders were of major importance, in keeping with the

variable clinical manifestations and the typical nervous system changes which accompanied the disease.

The normal yearly incidence of poliomyelitis with paralysis in the United States is 10 cases per 100,000 inhabitants. In the city and county of Los Angeles up to September 3, 1934, there were 1,792 cases with a positive diagnosis, 25 of which were fatal. The author's study was based on 1,160 of these. Four hundred and twenty were chosen at random except that one half were those of children up to fifteen years of age and the rest those of persons from fifteen to forty nine years of age. Since 337 of the total number of patients were over twenty years of age, the second group included about three-fourths of the cases of adults.

During the acute stage of the disease 20 per cent of the children had disturbances of urinary function varying from slowness in starting to void to complete retention. The majority had no difficulty until they were placed on the Bradford frame, but often the acute retention was the first symptom. Palliative measures were usually successful in relieving retention in children, but in a few cases single catheterizations were done. The younger the child, the less likely was urinary disturbance. In the older children urinary complaints were more frequent and more difficult to relieve. Urinary infections played a minor role in this group and appeared in the main to be flare-ups of previous trouble.

Of the adult patients, 135 had disturbances of urinary function varying from slight, transient dysuria to complete bladder paralysis. In some, especially the overworked personnel of the hospital, incontinence and inability to recognize bladder fullness were the first indications of the condition. Others experienced a short period of extreme vesical irritability with frequency followed by the development of complete retention with great distention as the detrusors became paralyzed. In another group sudden complete retention was the first sign of trouble. During the acute phase, coincident with distressing pain and contractions of the skeletal muscles, there were severe attacks of vesical irritability, bladder spasm, and hypogastric pain out of all proportion to the degree of distention, which could be relieved only by catheterization and the administration of antispasmodics in large doses (1 drachm of a 20 per cent solution of benzyl benzoate was the most effective). With the advent of somatic paralysis, the acute vesical distress was often lessened and frequently became relieved completely. However, recurrences were common and often lasted for as long as eighteen months. Acute bladder infection was not the underlying cause, as in many cases the urine was sterile. The picture was first that of a toxic peripheral neuritis of the bladder nerves causing muscle irritability followed by detrusor paralysis. Patients with little skeletal paralysis, who were soon ambulatory, suffered greatly from urinary dysfunction and bladder irritability. Among the direct con-

sequences of the condition were calculus, persistent urinary infection, severe and permanent impairment of renal function hydro-ureter, hydronephrosis, nephropathy, bladder diverticula, and urinary sepsis

The author believes that in the majority of the cases the immediate urinary dysfunction was due to a peripheral neuritis involving the bladder innervation and in a few to a neuritis of central origin. This origin explains the painful and irritable bladders, the spasmodic sphincters, and the acute retention. He attributes the remote urinary complications to (1) stretching and overactivity of the bladder musculature during the acute stage of the neuritis when these muscles should have been at rest, (2) chronic retention due to hypotonia and atony and long periods in the supine position and (3) infection resulting from frequent catheterizations in the presence of residual urine.

Wright expects in the future to consider suprapubic drainage as the first therapeutic indication in bladder involvement in poliomyelitis. He states that cystometric readings are proving of great value and interest, and that determinations of intravesical sensory reactions by the method of Moore have been begun.

LOUIS NEUWELT, M.D.

Crampon P and LaFrance L. The Gonoreaction Two Techniques (La gonoréaction Exposé de deux techniques) *J d urol med et chir* 1936 41: 431

Although little attention has been paid to the gonoreaction until recently, the complement deviation test of Bordet and Gengou was first applied to gonorrhea in 1906 by Muller and Oppenheim.

Crampon and La France report the results they obtained during the last two years with 2 techniques for the gonoreaction.

In the first method fresh serum with anti gonococcal vaccine from the Pasteur Institute was used as the antigen. In the second serum heated to 56 degrees C (adaptation of the method of Calmette and Massol) was employed. The findings made with these techniques in studies of the blood of 225 persons and the authors' conclusions based upon them are summarized as follows:

1 The gonoreaction becomes positive from five to twenty days after the onset of gonorrhea and becomes negative from four to six weeks after clinical and bacteriological cure. The degree of positivity increases and decreases with the degree of infection.

2 Chronic infections are characterized by a persistent positive reaction.

3 The test is always positive in the presence of complications.

4 It is negative in healthy individuals and rarely positive in non gonococcal infections.

5 The gonoreaction is of particular diagnostic value in gonococcal infection with complications. Its variations permit control of therapy. While they are not absolute, negative reactions constitute a good criterion of cure. MARSH W. POOLE, M.D.

Lichtenstein L. Rectal Stricture Due to Lymphopathia Venereum. *Ann Surg*, 1936, 104: 279

Lichtenstein has had a good opportunity to observe lymphopathia venereum and its relation to rectal stricture in the Charity Hospital in New Orleans. He reports a clinical and pathological study of six cases of rectal stricture due to the condition which came to autopsy. In four of these cases the diagnosis was made clinically. In three a positive Frei reaction was obtained. Lichtenstein emphasizes that rectal or anal biopsy should always be supplemented by the Frei test as histological examination alone is not always definitely diagnostic.

The usual histological findings are destruction and ulceration of the mucosa, with a tendency, upon regeneration of squamous metaplasia, infiltration and disruption of the muscularis by focal military accumulations of leucocytes and plasma cells and subsequent fibrosis dilatation of the lymphatics with perilymphangitis and endolymphangitis, and marked endarteritis and narrowing of the blood vessels such as may occur in any chronic inflammatory lesion.

Lichtenstein concludes that the advanced stage of involvement of the rectum by the virus of lymphopathia venereum is represented by chronic ulcerating proctitis and sigmoiditis.

FRANK M. COCHREAN, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC

Stern, W G Acute Transverse Bone Atrophy
J Bone & Joint Surg, 1936, 18 659

The author has noted a form of acute bone atrophy in fifteen cases, in which roentgenograms revealed a broad translucent band of bone resorption on the diaphyseal side of the epiphyseal line, parallel with the joint axis. This has been found most often in young adults after immobilization of the lower extremity in a plaster-of-paris cast for fracture. Stern has seen it also in four cases of disuse of the limb due to non-suppurating joint disease and two cases of tumor of the leg. The translucent zone is similar to that seen in scurvy, and the condition may be mistaken for acute disease or fracture. Stern believes that this form of bone atrophy or calcium resorption may be related to a vitamin deficiency.

CHESTER C GUI, M D

Harris, R I Difficulties in the Diagnosis of Bone Tumors
J Bone & Joint Surg, 1936, 18 631

The author discusses the value and limitations of the history and of physical examination, roentgenographic examination, and biopsy in the diagnosis of bone tumors, citing six illustrative cases.

In the first case, that of a man twenty-eight years old, the physical and roentgenographic examinations suggested a bone tumor or a low-grade osteomyelitis of the right thumb. However, the patient gave a history of tuberculosis, and biopsy showed the thumb condition to be a tuberculous inflammatory reaction.

In the second case, that of a girl fourteen years of age, the history and physical examination suggested a transverse compression myelitis of the cervical spinal cord, and the roentgenogram a giant cell tumor. Biopsy proved the lesion to be a Ewing endoetheloma.

In the third case, that of a woman twenty-one years old, the history and physical examination indicated a lesion of the right hip joint but did not suggest its nature, whereas roentgenograms showed the characteristic picture of osteolytic sarcoma. On biopsy, the lesion was found to be a giant cell tumor.

In the fourth case, that of a boy thirteen years old, the situation of the tumor—the position and type of the new bone formed as shown by the roentgenogram suggested an osteogenic sarcoma, but on histological examination of the specimen following amputation, the majority of the diagnoses made by the Registry of Bone Sarcoma were Ewing's endoetheloma.

In the fifth case, that of a man twenty-one years old, there was nothing in the history to suggest

tuberculosis of the shoulder, and the findings of roentgen examination were typical of giant cell tumor. However, frozen section and the recovery of tubercle bacilli after guinea pig inoculation proved the lesion to be tuberculous.

By these cases and many others the author has been led to the conclusion that biopsy is an important factor in the examination of cases of bone tumor and should always be performed in doubtful cases. The most serious objection to this procedure is the difficulty which the pathologist may experience in reaching a diagnosis even when he has the tissues under the microscope, as illustrated in the sixth case, that of a woman twenty years of age. In this case conservative treatment of a tumor of the left humerus seemed indicated because of a difference of opinion regarding the pathological picture. When amputation became necessary eventually and the specimen was submitted to the Registry of Bone Sarcoma a diagnosis of osteogenic sarcoma was made.

Among other objections which may be raised against biopsy is the possibility of disseminating the disease by cutting into the tumor. Nevertheless the author believes that biopsy is by far the most reliable aid to diagnosis.

RUNOLPH S REICH, M D

Karlstrom, F Suppurative Arthritis in Infants
(Eitrige Gelenkrankungen bei Säuglingen) *Stensh Lakartidn*, 1936, p 250

During the period from 1904 to 1933 the author saw 168 cases of septic arthritis. These constituted about 1 per cent of the cases coming under his observation. Forty-two (about 25 per cent) of the patients with this condition were infants less than one year of age. In the cases of thirty-one of the infants the arthritis was found on arthrotomy to be suppurative. Therefore the incidence of suppurative arthritis was much higher than at any later period of life.

Direct infection of the joint from without plays a very minor rôle in the development of the condition. In none of the thirty-one cases was it responsible. Of chief importance is a secondary infection of the joint cavity occurring by way of the blood stream or from a focus of osteomyelitis in adjacent bones (Beckman, Finkelstein, Jemna, Johansson, Koch, Paschla, Rankin, Santi). In the author's thirty-one cases the portal of entry of the infection was apparently the umbilicus. This was indicated by the fact that in almost half of the cases the infection appeared during the first month, and in almost two-thirds in the first two months of life. The so-called diseases due to chilling play no part in the causation of the condition, since in the cases without demonstrable umbilical infection the frequency of the in-

fection was uniform throughout the year. Herzog and Pfisterer, among others, emphasize the importance of otitis as an etiological factor. The incidence of this condition as the cause has been reported as high as 91 per cent.

According to the literature the monarticular form is the more frequent. Of the author's cases, the arthritis was monarticular in twenty-four and polyarticular in seven. The large joints are affected most often. Of the author's cases the knee was affected in fourteen, the hip in ten, the ankle in seven, the shoulder in three, and the elbow and wrist in two each.

The frequent assumption that the disease begins with a high temperature has been proved incorrect. The prognosis as to life is unfavorable. Of the author's thirty-one patients ten died. Six of the latter were less than one month old. The mortality of pyemia with subsequent arthritis is higher in the first month of life than in all succeeding months.

Reports regarding the late results of suppurative arthritis in infants have been few. Often infants whose cases were reported by Drehmann, eight survived coxitis and 2 survived gonitis. Six of the eight had a hip dislocation and two had coxa vara. Of the two others one had genu valgum and the other genu varum with a flail joint. Edberg reported that on subsequent examination he found a dislocation of the hip in three children who had had coxitis but no noteworthy defects in one who had had an inflammation of the knee and shoulder or one who had had bilateral arthritis of the knee. On re-examination of eleven children Paschla found ankyloses in four, moderate defects in three and no defects in four. In the literature it is agreed that the "so-called pseudogenital dislocation of the hip" is the result of coxitis in infancy. (GERLACH) LOUIS NEUFELT, M.D.

Harrenstein R. J. Scoliosis in Infants and Young Children (Sur la scoliose des nourissons et des jeunes enfants). *Rev. d'orthop.* 1936 43 289.

Harrenstein reports that he has seen 100 cases of scoliosis in infants and young children under two years of age, none of which was of the congenital type as the roentgenograms showed no abnormalities in development of the vertebrae. Forty-six of these children have been under treatment and prolonged observation. They showed not only a lateral curvature of the vertebral column but also bulging of the ribs on one side due to rotation of the spine. In most of the cases it was the rib bulging that called the attention of the mother to the deformity.

Of the 46 patients whose case, are reviewed, 29 were girls. In most of the cases the signs were first observed between the third and seventh month of age. Roentgenograms made with the arms fixed in position and the legs under slight traction showed that in 37 cases there was a single curvature in the spine. In 29, the curve was convex toward the left. The apex of the curvature was usually at the level of the eighth and ninth thoracic vertebrae. In the cases of 9 infants examined after the age of eight

months there was a compensating curvature in the lumbar region.

In the treatment the child was kept for twenty of each twenty-four hours on its back in a plaster "bed" which extended over the back of the head and was fitted to the patient so that the arms were left free. Corrective pressure was exerted over the bulging of the ribs and over the convexity of the spinal curvature. For the remaining four hours of the twenty-four the patient was kept in ventral decubitus in a corset to prevent atrophy of the muscles of the back. When the roentgenogram showed improvement in the spinal curvature after several months of their treatment the number of hours in ventral decubitus was increased and the number of hours in plaster decreased. Only after a considerably longer time was the patient allowed to sit or stand erect and then only under careful supervision.

Of the 37 patients with a single curvature 11 are completely cured, as shown by roentgenograms made after periods of from one to six years. 11 have not been completely cured. 4 cannot be thoroughly examined. 1 is dead, and 10 are still under treatment. Of the 9 patients with a double curvature 1 is cured, 3 show improvement, 3 show an increase in the curvature, and 2 are still under treatment.

The cause of this type of scoliosis in young children could not be determined. There was no evidence that the manner in which the child was carried by the mother had an influence. Rickets was not a factor as in many of the cases the scoliosis developed before the age when rickets becomes evident and in these cases rickets did not develop later.

In conclusion the author says that as scoliosis in infants and young children is undoubtedly a forerunner of scoliosis at a later age if it is not correctly diagnosed and treated and as treatment is more difficult and less satisfactory in older children, it is important to recognize the condition and treat it as early as possible. ALICE M. MEYERS

Hanson R. Tuberculous Spondylitis in Cases of Kyphosis Dorsalis Juvenilis or Adolescentium (Ueber tuberkulose Spondylitis bei Facilen von Kyphosis dorsalis juvenilis und adolescentium). *Acta chirurg. Scand.* 1936 78 297.

The author calls attention to the fact that as early as 1926 he expressed the opinion that kyphosis dorsalis juvenilis or adolescentium may be due either to hereditary factors or to disturbances of internal secretion. He still holds the opinion that large step-like formations at the site of the future epiphyses in the middle thoracic vertebrae may represent the preliminary stage of that condition.

On the basis of his publication in 1926 he denies the right of Schmorl to priority in the demonstration of certain peculiarities of the vertebrae of adults and children to which he called attention two years earlier.

He states also that, long before Schmorl, he showed that the epiphyses play only a secondary

role in the development of the vertebral bodies, and that the most important factors in kyphosis juvenilis or adolescentium are disturbances in the zone of ossification.

He emphasizes also that, two years before Schmorl, he demonstrated that the epiphyses of the vertebral bodies may develop earlier than was previously supposed. Their earliest development in his cases occurred in a girl six years old. He states also that, two years before Schmorl, he showed how small a rôle is played by the epiphyses in the further development of the vertebral bodies.

He criticizes Schmorl's views regarding the importance of the nucleus pulposus in the occurrence of certain changes in the vertebral bodies. He maintains that the nucleus pulposus is a secondary rather than a primary development. He states that the primary cause of kyphosis dorsalis juvenilis has not yet been demonstrated. In his opinion Schmorl's theory that the nucleus pulposus is the cause of kyphosis dorsalis juvenilis is incorrect because in kyphosis the nucleus pulposus must be displaced backward whereas in kyphosis dorsalis juvenilis the changes occur in the anterior portion of the vertebral bodies.

With regard to the origin of kyphosis dorsalis juvenilis Hanson states also that Schmorl has not given sufficient consideration to the fact that, if degeneration of the cartilaginous disk occurs, connective tissue elements from the bone marrow may grow through the end disk and thus change the roentgen picture of the vertebral bodies in the absence of nuclei pulposi. He insists that the development of the lesion is dependent upon a traumatic, degenerative, or infectious lesion of the cartilaginous disk, and that the nuclei pulposi must be considered, not a primary, but a secondary, manifestation.

He reports seven cases which suggested the possibility of a relationship between kyphosis dorsalis juvenilis and tuberculous spondylitis.

In conclusion he states that Schmorl's claim that in the late stages of kyphosis dorsalis juvenilis or adolescentium a diagnosis can be made by roentgen and pathologic anatomical examinations alone is incorrect as there are several diseases occurring during advanced age in which the findings of roentgen and pathological examinations are similar.

Bennett, G. E., and Shaw, M. B. Cysts of the Semilunar Cartilages. *Arch. Surg.*, 1936, 33, 92.

Cysts of the semilunar cartilages occur most frequently in the lateral meniscus and between the ages of fifteen and twenty-five years. They are more common in males than in females. In about half of the cases there is a definite history of injury. The symptoms usually have an insidious onset. They consist of a localized aching pain, the development of a mass, and early fatigability of the limb. Examination reveals over the anterior third of the cartilage a mass from 1 to 5 cm. in size which is firm or semisolid, usually fixed in position, and moderately tender. Evidences of local inflammation

or of arthritis are absent. The diagnosis is not difficult as the only other common lesions to be considered are bursæ and synovial diverticula.

The cause of the cysts is unknown, but the authors believe it is a direct trauma to the capsular border which results in mucoid degeneration. This theory is supported by the age of the patients and the location of the cysts in the lateral or most readily bruised cartilage. Cyst formation is rare after tearing injuries, which are more common in the internal cartilage, and is much less common in the medial meniscus. Some surgeons believe the cysts are of congenital origin, while others think they are synovial inclusions akin to ganglions.

The cysts vary in size. The larger ones protrude into the joint capsule. Tiny cysts may occur in the cartilage itself. The cysts are multilocular and contain a mucoid fluid which resembles egg white. They are in, or arise from, the anterior two-thirds of the cartilage. Microscopic examination reveals a wall of fibrous tissue or fibrocartilage, often with a lining of thin cells resembling mesothelial cells.

The treatment is surgical. The meniscus should be removed with the cysts as otherwise recurrence is likely. The authors report 4 cases, bringing the total number reported to date to 163.

CHESTER C. GUY, M.D.

Mueller, E. W. The Ossification of the Bones of the Tarsus in Congenital Clubfoot. A Contribution to the Etiology and Therapy. (*Die Ossifikation der Fusswurzelknochen beim angeborenen Klumpfuß. Ein Beitrag zur Ätiologie und Therapie.*) *Ztschr. f. Orthop.*, 1936, 64, 244.

Reliable data concerning ossification of the tarsus were first supplied by Hasselwander in 1903. The ossification centers may be delayed in making their appearance as the result of general and local injuries. In 1927 Wilhelm found frequent delay in the development of the navicular bone—absence of the nucleus after the fifth year of life—in cases of clubfoot, especially those in which the condition showed a marked tendency to recur. In 1928, Boehm found hypoplasia of the wedge bones and navicular bone and deformity of the calcaneus as pathognomonic signs of the growing clubfoot skeleton. He regarded these findings as evidence supporting the theory that clubfoot is a primary osseous malformation due to arrest of development.

The author examined the roentgenograms of fifty-seven children with clubfoot who were under five years of age and about thirty who were over five years of age. In four, the clubfoot was in the stage of development. In none of the children over five years of age was absence of the ossification center of the navicular bone observed. Of those under the age of five years, ossification was delayed in only six. In five of the latter it was delayed in the external wedge bone, and in one, in one of the other wedge bones. In half of the cases the ossification center of the first wedge bone was visible before the average time of its appearance, and in ten this

bone was markedly hypertrophied. This condition was found also in bilateral clubfoot, on the side of recurrence with simultaneous delay of development of the navicular bone. The delay of ossification cannot be attributed to a specific cause as exogenous influences are the deciding factors.

Of the greatest importance is early proper treatment. Normal function leads to the development of normal skeletal elements. The calcaneus and the first wedge bone are especially moldable under the influence of therapy. The first wedge bone is able to act in a compensatory manner for the underdeveloped navicular bone. The malformation of the bones of the tarsus in untreated or insufficiently treated clubfoot is to be regarded as the result of poor nutrition due to inadequacy of the blood supply. The navicular bone is most markedly subjected to these influences. Other factors are disturbances of the developmental processes caused by disturbances of the central nervous system as described by Maus and the results of abnormal functional demands.

Recurrences are to be attributed to changes in the soft parts. While the hypoplasia of the bones of the tarsus is a sign of resistant clubfoot it is the result rather than the cause of misguided developmental processes. For this reason these changes also are capable of retrogression up to a certain point. The difference between the author's results and those of Wilhelm and Boehm is explained by the fact that, because of the influence of the laws governing the care of encephals the author's patients were given proper treatment at an earlier date.

The theory that mechanical influences during intra uterine life are responsible for clubfoot must be rejected for most cases as it is not compatible with the constant ratio of males to females with the condition which is 2:1. The assumption of a primary nucleus injury of the skeleton is applicable only to cases of clubfoot with malformation. The neuromyopathic hypothesis, according to which the primary factor is a developmental disturbance of the medullary canal resulting in disturbance of the equilibrium of the musculature, is perhaps best supported by clinical observations.

Treatment should be given early in order to make use of the growing energy of the first months of life. At the Frankfurt Clinic the method of Wislizenus is employed as the procedure of choice.

(VON DANCKELMAN) HARRY A. SALZMAN, M.D.

SURGERY OF THE BONES, JOINTS MUSCLES, TENDONS ETC

Mayer, L. and Ransohoff, N. Reconstruction of the Digital Tendon Sheath. A Contribution to the Physiological Method of Repair of Damaged Finger Tendons. *J. Bone & Joint Surg.* 1936, 18: 607.

The results of tendon transplantations following division of the flexor tendons of the fingers have been extremely disappointing because of the formation of adhesions which bind the distal stumps of the

flexor digitorum sublimis and the flexor digitorum profundus tendons to one another and to the inner wall of the tendon sheath. These adhesions extend from the point of division of the tendons down to the distal end of the digital sheath and destroy the smooth cells on the surface of the tendon and the sheath. The proximal tendon stumps retract, leaving a gap of several inches between them and the distal stumps, and they become bound to one another by adhesions although the latter rarely extend proximally for more than 1 in. The gap between the tendon ends becomes filled with scar tissue which replaces the tendon sheath and destroys the normal gliding mechanism so that only in exceptional cases can an implanted tendon function normally. If infection occurs the degree of damage is increased.

During the past four years the authors have been attempting to improve the technique of tendon transplantations for damaged fingers, working on the theory that if a smooth walled tendon sheath could be constructed to replace the scarred one, an implanted new tendon might retain its gliding function. Carrying on the work of Prime they discovered that tubes of pure celloidin produced smooth tissue with flattened cells resembling those lining the wall of the tendon sheath. Many methods of applying the tubes to damaged fingers were tried and discarded before the following procedure was devised.

Celloidin tubes of the necessary smoothness are produced by dissolving a thick solution of chemically pure celloidin in acetone and pouring it slowly into test tubes of the desired sizes—large 1 cm., medium, 0.8 cm. and small 0.6 cm. The slow evaporation method is used, five months being required to complete evaporation. The tubes are kept in a solution of distilled water until the time of operation and then sterilized by immersion in a 1:2,000 solution of oxyzanate of mercury for twenty minutes.

The operation is performed in two stages. The first consists of complete resection of the scarred tendon sheath and damaged tendons and the implantation of a celloidin tube extending from the proximal stumps of the tendon down to the distal attachment of the flexor profundus at the base of the distal phalanx. The second stage is performed from four to six weeks after the first. At this operation the tube is removed and a free tendon graft implanted the mode of procedure depending upon the condition of the finger. The tendon most suitable for the purpose of implantation is the flexor sublimis of the injured finger, but if the muscles of the damaged finger do not appear capable of regeneration it is better to use the sublimis muscle of the adjacent finger.

The after treatment is extremely important. The finger is splinted in the straight position to prevent flexion contracture. Passive motion is begun as soon as the wound is healed, usually on the seventh or eighth day, and active exercises combined with sinusoidal stimulation of the muscles are begun on the ninth or tenth day. The physical therapy is

continued for many weeks or even months until function has been regained

RUDOLPH S REICH, M D

Compere, E L. Indications for and against the Leg Lengthening Operation. The Use of the Tibial Bone Graft As a Factor in Preventing Delayed Union, Non-Union, or Late Fracture *J Bone & Joint Surg*, 1936, 18 692

Inequality of leg length up to $1\frac{1}{2}$ in. can be compensated for by pelvic tilt and requires no treatment. Greater inequality may be corrected by shortening the normal leg or lengthening the short one. The former is the procedure of choice and in the young adult or adolescent may be accomplished by resection of a portion of the longer femur. In the cases of younger patients it is wiser to arrest growth by fusing to the shaft one or more epiphyses of the longer limb.

Leg lengthening operations are formidable and frequently followed by complications such as osteomyelitis, bone necrosis, non union, malunion, nerve paralysis and muscle weakness. The author reports five cases, in all of which a major complication developed and in one of which death resulted. He states that such operations are contra indicated when the shortening is less than 3 cm., when the patient is less than fifteen years old, when the patient is tall or will not be disturbed by reduced height from shortening of the normal leg, when the hip or knee muscles are weak or paralyzed, when the shortening is very marked, when there is a history or evidence of osteomyelitis or other bone disease anywhere in the short leg, and when the shortening is congenital or there are severe deformities. However, in spite of these contra indications and the frequency of operative failures, he believes that leg lengthening is indicated in certain selected cases. He reports a case in which successful operations were performed on both the femur and the lower leg with a resulting increase of 5 in. in the length of the leg.

In discussing the operative technique of leg lengthening he recommends a diagonal osteotomy with the application of a tibial onlay graft to bridge or overlap the defect when the lengthening is obtained by skeletal wire traction.

CHESTER C GUY, M D

FRACTURES AND DISLOCATIONS

McFarland, B. Congenital Dislocation of the Head of the Radius *Brit J Surg*, 1936, 24 41

In congenital dislocation of the head of the radius there is no fusion of the radius and ulna and no paralysis. The head of the radius is displaced forward and is quite free from the ulna. It can be moved through a considerable range, but cannot be replaced in its normal position. This is significant because traumatic dislocation of the head of the radius, particularly if it is uncomplicated by fracture of the ulna, is reduced with ease and often becomes reduced spontaneously.

In the roentgenograms the congenitally dislocated radius appears too long for the ulna and its head appears poorly formed. There is an anterior curve of the posterior margin of the ulna which starts at the level of the coronoid fossa. While this is sometimes slight, it is definitely contrary to the slightly posterior curve normally present at this level. A variation is noticed also in the anterior outline of the ulna. Instead of the backward sweep from the coronoid almost a straight line is seen. These features, together with the impossibility of reducing the head of the radius, point to a congenital rather than an acquired dislocation.

The author has treated eleven children with congenital dislocation of the head of the radius. In all, the dislocation was anterior and unilateral. In only five were there functional disturbances necessitating operation. The operation consisted of removal of the head of the radius.

For successful reduction, the child must be young, preliminary traction must be employed, and an orbicular ligament must be formed at operation.

NORMAN C BULLOCK, M D

Frank, I. Spontaneous (Non-Traumatic) Atlanto-Axial Subluxation. *Ann Otol, Rhinol & Laryngol*, 1936, 45 405

The author reports a case of spontaneous non-traumatic atlanto axial subluxation and reviews the literature on the condition in order to call this type of subluxation to the attention of otolaryngologists.

He states that subluxation of the atlas on the axis is always associated with rupture or relaxation of the transverse ligament. While rupture is always the result of trauma, relaxation may follow various conditions. As reported by Jones, the one predisposing factor which is constant in non traumatic cases is an inflammatory focus in the upper neck. It has been found that any infection causing hyperemia in the region of the base of the skull may give rise to the condition. The literature shows how closely interwoven are the lymphatic connections of this region and therefore how readily an infection may spread from the middle ear or retropharyngeal space to the bones of the atlanto axial joint.

Infection causes a hyperemia resulting in decalcification and softening of the arch of the atlas. Under such conditions there is no secure attachment for the lateral ligament and even a slight movement may avulse the ligament and permit anterior displacement of the atlas. With slight avulsion, the subluxation is incomplete and gives rise to the clinical syndrome of atlanto axial subluxation commonly observed, but with complete avulsion there may be medullary interference and death will probably result.

An acquired torticollis with muscular spasm following an infectious disease should at once arouse the suspicion of subluxation or at least a rotatory deformity of the atlanto axial joint. The presence of either of these conditions may be determined by roentgenography.

In the case reported by the author that of a boy aged nine years, the lesion originated from a retropharyngeal abscess. The treatment consisted of recumbency in hyperextension with head traction in a Sayre sling. The head of the bed was elevated. When the acute symptoms had subsided and roentgenograms showed reduction, a plaster cast extending from the hips up to, and including the chin and occiput was applied. Recovery was complete at the end of six weeks.

RUDOLPH S. REICH, M.D.

Blodgett W. E. and Fairchild R. D. Fractures of the Patella. Results of Total and Partial Excisions of the Patella for Acute Fracture. *J. Am. Med. Ass.* 1936 106 2121

The authors present a series of twenty cases of fractured patellæ in which part or all of the bone was excised. They compare this series with another of thirty five cases in which the patella was repaired by some method of suturing and find the length of hospitalization was shorter in the former group. They advocate removal of the proximal fragment if the distal fragment is usable and of the whole bone if it is markedly fragmented. They feel that it is of great importance in every case to repair the lateral and medial capsular tears. The operation is simple and has given satisfactory functional results. The postoperative treatment consists of the application of a posterior mold with the knee in full extension. Passive motion is started on the ninth or tenth day. Weight bearing is begun after two weeks.

BARBARA B. STIMSON, M.D.

Schofield R. O. Fractures of the Os Calcis. *J. Bone & Joint Surg.* 1936 18 566

The author presents a series of fifty two consecutive cases of fracture of the os calcis treated by the

method of Boehler. In 25 per cent the calcaneal fracture was associated with other fractures of the ankle or foot and in 12 per cent with vertebral fractures. Five types of fractures are described with tables to show the course and results in each of the groups.

Type 1 is the so called avulsion fracture with medial displacement of the sustentaculum tali which is treated by direct compression and the application of a plaster cast with the foot inverted and dorsiflexed. Type 2 is a fracture of the body with no displacement of the fragments and not involving any joint surface. This is treated by the application of a cast. Type 3 is a fracture of the medial process of the tuberosity, which is treated under local anesthesia by use of the Boehler clamp followed by the application of an unpadded cast. Type 4 are fractures of the trochlear process and the anterior portion of the body which are treated by screw traction or by manual traction followed by the application of unpadded plaster. Those of Type 5 are the comminuted fractures of the body with displacement and involvement of the subastragaloid joint. These are treated under spinal anesthesia by traction through the bone by means of a Boehler pin with a second pin through the tibia. An extension frame is used and plaster is applied after roentgenograms show satisfactory position. The upper pin is then removed and the leg placed in a Braun frame with a weight of 7 lb. on the os calcis pin. The circulation of the toes must be carefully watched during the first twenty four hours. The cast is routinely removed for inspection of the leg every twenty-one days. The average loss of function in the author's cases was only 12 per cent.

Photographs and roentgenograms accompany the article.

BARBARA B. STIMSON, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Champy and Jacques Louvel The Perivascular Sheath (La périvascular gainne synoviale)
Presse méd., Par., 1936, 44 857

As comparison of the adventitia of the veins to a synovial sheath appears justifiable from both the physiological and the pathological viewpoint, the authors attempted to prove this relationship histologically. After demonstrating a parallelism between periphlebitis and synovitis, they report the results of their studies which confirmed their clinical impression by revealing the presence in the perivascular endothelial formations and serous cavities adapted for gliding.

They state that from the physiological point of view it is doubtless the external tunic which insures the relative mobility of the vessel within the surrounding structures. Especially the superficial veins of the limbs require a gliding sheath to insure their active and passive mobility.

However, it is particularly in pathological conditions that the adventitial cuff manifests its importance. The perivascular is, in fact, very susceptible to irritation, being easily inflamed and liable to sudden short exacerbations of inflammation if mobilization is premature. Moreover, under the influence of chronic infectious, toxic, humoral, or glandular disturbances it may become thickened, and adhesions resulting in pain and secondary dystrophies may form between its layers.

A study by direct vision and palpation of the inflammatory reactions of a vein isolated from its satellite artery may be made most easily in the superficial subcutaneous vascular system.

Clinically, the perivascular does not assert its individuality except in chronic or subacute infections. In very acute processes all parts of the vein react. In cases in which the adventitia alone is involved, immobilization and compresses to relieve congestion soon restore the vein to its normal condition and function. The elastic and muscular structures do not seem to be much affected. In some patients recovering from subacute venous septicemia the permeability and flexibility of the veins are retained even though the infectious process was protracted. Of course, in the cases of such patients the involvement was exclusively periphlebitic. However, strict immobilization is necessary in the treatment in order to prevent recurrence and extension to the deeper coats of the vessel. Whether the condition is a periphlebitis or a total phlebitis, it is the adventitia which constitutes the primary element of reaction and propagation of the inflammation along the veins.

In the early as well as the advanced stages of tuberculosis the Koch bacillus may be the cause of

phlebitis or periphlebitis which frequently develops simultaneously with involvement of one or more serous membranes such as serofibrinous pleurisy, pleuropneumonic serositis, hyarthrosis, and arthritis. Therefore the adventitia takes part in the reaction of tissues similar to itself.

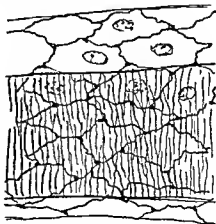
Very vascular and rich in nerves, the adventitia, like the capsule of a joint, reacts not only to infections but also to a large number of humoral, metabolic, and endocrine disturbances. Being of mesenchymal origin like the synovia, it is particularly susceptible to rheumatic affections.

Clinically, it is the external tunic which is first affected by dystrophic processes. The vein is attacked from without inward. Repeated attacks of adventitial hyperemia cause serious disturbances in the circulation and nutrition of the venous wall, not only locally, but also at a distance. As the result of such disturbances, atrophy or hyperplasia occurs at irregular intervals along the vein, depending upon whether parietal ischemia or congestion predominates.

From a histological study of the perivenous tissue of the frog, the authors have come to the conclusion that the perivenous sheath is related to the synovial sheaths more closely than to the lymphatics.

The constant finding of an endothelial lining in these sheaths was not the only discovery of importance. These sheaths, with their parietal and visceral layers united by a sort of mesentery, contain also elements which are not present in all connective tissue, viz., melanocytes. Particularly evident about the larger veins are rows of melanocytes corresponding to the two layers of the adventitial tissue.

With a little practice it is easy to inject the perivascular sheaths of a whole rete in the frog. This is not possible in other vertebrates. Microscopic study



Perivascular sheath of the mesentery of the frog. Silver impregnation

of perivenous cavities injected with nitrate of silver showed that these cavities also are lined with endothelium

Perivenous injections of Chinese ink and nitrate of silver into the veins between the tendons of the feet of sheep likewise revealed endothelium

Comparison of the flat cells of the endothelium with those of the tendinous sheaths showed them to be identical except that the former were somewhat shorter

Inflammatory processes seem to have a certain affinity for perivascular tissue a fact which seems to be related to the colloid fixing properties of that tissue

In their studies of the venous walls the authors used the methods employed by Petroff and Anitschkow and others in studies of arterial walls In the latter, injections of trypan blue into the blood stream resulted in fixation of the stain by the internal sub-endothelial portion and the entire external portion of the artery The authors noted an analogous result in the veins The external layer was most strongly stained and the internal layer stained only slightly, while the musculo-elastic median layer remained unstained This fixation seems therefore to be a special property of the adventitial cells which is analogous to that of the reticulo-endothelial tissue Besides an abundance of nerve endings the silver impregnation method showed a system of circular arborizations penetrating the parietal and particularly the visceral layers of the perivenous sheaths This finding supports the modern theory which attributes a reflexogenic rôle to the adventitia the importance of which is becoming increasingly evident

EDITH SCHACHE MOORE

Barker N W Primary Idiopathic Thrombophlebitis
Arch Int Med 1936 58 147

This report is based on a study of 79 of 1011 unselected consecutive cases of thrombophlebitis of all types which were seen at the Mayo Clinic in a period of five years The patients had no evidence of constitutional disease such as carcinoma or arthritis They had undergone no surgical operation or childbirth recently and had had no recent specific infectious disease They were free from recognizable disease of the heart and dyscrasias of the blood They gave no history and presented no evidence of gross mechanical trauma or of local infectious or suppurative processes in the region of the veins They had had no previous disease of the veins such as varix Careful examination for occlusive disease of the peripheral arteries was negative Therefore known causes of thrombophlebitis and conditions in which thrombophlebitis is sometimes a complication were absent and there was no recognizable factor of abnormal venous stasis

The arbitrary division of cases of idiopathic thrombophlebitis into 2 groups according to whether there have been multiple episodes or one episode has occurred is open to question It is possible that some of the patients who have had a single episode may

have recurrences However, of the patients whose cases are analyzed by the author, 20 (more than half) who have been observed for a year and seven who have been observed for at least five years have had no recurrences Of those with recurrent thrombophlebitis, only 7 had intervals between episodes as long as a year There were certain other differences between the 2 groups The patients who had single episodes did not reveal any striking similarities as to age, sex or occupation, but showed a rather high incidence of obesity In this group there was rather extensive thrombophlebitis, usually of large venous trunks and less frequently of medium sized veins In these respects non-recurrent idiopathic thrombophlebitis resembles the secondary or complicating types

The term 'thrombophlebitis migrans' is not used in this article as it has been employed too loosely in the literature Recurrent idiopathic thrombophlebitis is predominantly, although not exclusively, a disease of young and middle aged men It is essentially and primarily a disease of small and medium sized veins The lesions tend to occur in short segments and appear to be definitely inflammatory These observations suggest an analogy to thrombo-angitis obliterans which also is a disease of young and middle aged men, involves short segments of the vessels and has a definite tendency to recur in episodes However, thrombo-angitis obliterans involves chiefly arteries although sometimes it attacks both arteries and veins Since, according to Buerger and Johnson, the arterial lesions of thrombo-angitis obliterans may develop in cases of migrating superficial thrombophlebitis, it is possible that some of the patients whose cases are analyzed in this article may have had early thrombo-angitis without arterial lesions However, it seems certain that arterial lesions which can be recognized clinically do not develop in most cases of recurrent idiopathic thrombophlebitis Recurrent idiopathic thrombophlebitis shows some differences from typical thrombo-angitis obliterans with involvement of the veins The limitations as to age and sex are less sharp There is some tendency for recurrent thrombophlebitis to involve large veins (femoral and iliac in 33 per cent of the cases) These veins rarely are involved in thrombo-angitis

The recognition of idiopathic thrombophlebitis as a cause of transient and prolonged disability and occasionally of death as well as recognition of its unsolved problems should stimulate further investigation regarding the cause and pathogenesis of the condition

Idiopathic or primary thrombophlebitis is a definite clinical entity The study of the 79 cases shows that there are 2 types (1) a recurrent segmental inflammatory venous lesion which tends to involve chiefly small and medium sized veins and occurs most commonly in young and middle aged males, and (2) thrombophlebitis of medium sized and large veins which is accompanied by less inflammation and occurs as a single episode without par

ticular relationship to age or sex. Histopathologically, recurrent idiopathic thrombophlebitis is similar to thrombo angitis obliterans. Cultures of segments of affected veins obtained for biopsy have disclosed nothing abnormal. The patients studied showed a high incidence of definite focal infection in tonsils, teeth, and the prostate gland. Pulmonary infarction occurred in 30 per cent and fatal pulmonary embolism in 5 per cent. Chronic venous insufficiency of a limb occurred in approximately half of the patients with recurrent thrombophlebitis and two-thirds of those with non recurrent thrombophlebitis.

Veal, J R, and McFetridge, E M. Vascular Changes in Intermittent Claudication, with a Note on the Value of Arteriography in This Symptom Complex. *Am J M Sc*, 1936, 192 113

The authors state that although intermittent claudication has been recognized for many years as a possible concomitant of peripheral vascular disease, many phases of the condition are still little understood. Intermittent claudication is a very uncommon phenomenon, and its presence seems entirely unrelated to the type or degree of the vascular disease with which it is associated. Frequently it is evident in patients whose disease never passes beyond the initial stage and just as frequently it is absent in those with terminal gangrene. The origin of the pain has never been satisfactorily explained. Even the most logical of the theories is largely hypothetical.

After briefly reviewing the theories advanced to explain the pain of intermittent claudication the authors report the findings of arteriography in fifteen selected cases of intermittent claudication in which the pathological changes were studied in 1910. Fourteen of the patients were males. Twelve were white and three were colored. The age range was from twenty three to seventy seven years. Five patients were between fifty and sixty years old. The duration of the symptoms varied from two months to four years. The first symptom was a sense of fatigue after walking. By slow degrees the fatigue passed over into pain which gradually increased in severity. The pain was usually described as a cramping or drawing sensation in the calves. In each case it varied in its duration and severity and in the amount of exercise necessary to produce it. In twelve cases the etiological basis was definitely arteriosclerotic. In the remaining three the cause was not definitely determined, but syphilis and Buerger's disease were ruled out.

Arteriographic studies were made of the regional blood supply with the use of stabilized thorium dioxide as the opaque agent. On the basis of the findings the cases could be divided into three groups. In the first group, of six cases, the etiological basis was arteriosclerosis and the most outstanding change was obliteration of the large arteries. In the second group, also of six cases, the etiological basis was again arteriosclerosis, but the large arteries were not

obliterated, their lumina being only markedly narrowed. There was a marked diminution in the size of the muscular branches and in the number of the finer muscular terminals. The new collateral blood supply was definitely inadequate. In the third group, in which there were three cases, the etiological basis of the claudication could not be discovered, the muscular branches showed a peculiar clubbing and dilatation which terminated very abruptly, and no change was evident in the main arteries.

The study yielded arteriographic evidence in support of the contention that the pain of intermittent claudication is not due to arterial spasm. An arteriogram made during the period of intense pain after exercise revealed an increase in the size of lumen of the artery rather than the decrease that would be expected with spasm. It showed also some enlargement of the muscular branches as well as a visualization of numerous fine branches, conditions not seen in arteriograms made of the same patient during a period of rest.

Finally, the authors report an illustrative case which demonstrated that the improvement following the application of heat, exercise, and similar measures of therapy in intermittent claudication is due, not to a change in the vascular supply, but presumably to the temporarily increased nutrition of the parts, resulting from such treatment.

HERBERT F. THURSTON, M.D.

Lucarelli, G. Thromboses and Thrombotic Emboli of the Pulmonary Artery (Trombosi ed embolie trombotiche dell'arteria polmonare). *Clin chir*, 1936, 12 29

Lucarelli reports an analytical and statistical study of fifty-eight cases of pulmonary thrombosis and embolism coming to autopsy at the Pathological Institute of the University of Florence in the period from 1918 to 1935 and thirteen cases studied at the University of Perugia in the period from 1925 and 1934. He discusses the etiology, frequency, mechanism, and symptomatology. The two lesions are considered together because of the frequent difficulty and in some instances the impossibility of distinguishing between them at autopsy.

In Lucarelli's opinion the fundamental causative factors are cardiovascular lesions and circulatory disturbances in general. Other factors, such as age, sex, and constitution, act only indirectly through their influence on the cardiovascular system. Functional disturbances of the circulation, often latent or undiagnosed, are important in the pathogenesis. In the reviewed cases arteriosclerosis of the pulmonary artery was not found often, and the frequency of pulmonary embolism had no relationship to the infectious diseases most prevalent in a given year. Lucarelli's statistics confirm the observation of others that the site of operation has an important bearing on the occurrence of postoperative pulmonary embolism, this complication being most frequent after operations on the lower half of the body.

In the reviewed cases it was most common after operations for inguinal hernia and next most common after gynecological procedures.

A post war increase in the frequency of pulmonary embolism and thrombosis has been shown by statistics in England and in Germany, especially the latter country. It began in 1924 and in Germany continued at least until 1933. In Lucarelli's relatively small series the frequency curve showed a marked fluctuation from year to year, but no notable peaks. The mortality curves of pulmonary embolism covering long periods, such as from 1881 to 1900 and from 1889 to 1911 and including large numbers of cases in several countries have shown rises similar to the rise of recent years. Nevertheless it is reasonable to believe that the post war rise was due to the decimation of young men in the war with the consequent increase in the age of subjects coming to autopsy and the relative increase in the number of women, in whom the "embolic type" is perhaps more common than in men.

The article is accompanied by a large number of tables and an extensive bibliography.

N. L. Moase, M.D.

Cohen S. S. and Barron M. E. Thrombo Angioma Obliterans with Special Reference to Its Abdominal Manifestations. *New England J Med* 1936 214 2275.

Cohen and Barron review the literature pertaining to the autopsy findings in thrombo angitis obliterans and present abstracts of thirty nine autopsy reports.

They state that thrombo angitis obliterans is a generalized disease process which may affect vessels anywhere in the body producing a clinical syndrome dependent upon the vessels and organs affected. In the chronic stage of the disease arteriosclerosis often accompanies and may displace, the typical thrombo angitic changes in the involved vessels. Under such conditions a presumptive diagnosis of thrombo angitis obliterans can be based only on clinical evidence. Suggestive abdominal signs and symptoms in a patient with thrombo angitis obliterans of the extremities may be due to involvement of the intra abdominal vessels. Recognition of this fact may modify the therapeutic approach and prognosis.

The authors review also the literature on 'abdominal Buerger's disease' and present abstracts of fifteen case reports. They then report in detail a presumptive case of this condition in a thirty five year old man who had a six year history of proved thrombo-angitis obliterans of the extremities and, six months and four months previously had had an acute gastro intestinal disturbance. Operation disclosed spotty gangrene of the hepatic flexure of the colon, poor pulsations in the vessels near the bowel margin, and thickening and fibrosis of the left common iliac artery. Drainage of the abdomen was followed in turn by a fecal fistula and an inflammatory stricture. Because of the progressing obstruction an ileo tran-

verse colostomy was done. The authors are of the opinion that thrombo angitis obliterans of the mesenteric vessels was the fundamental basis of the intra abdominal process. They believe that proof of this condition may be forthcoming at resection of these vessels at some future date.

HERBERT F. THURSTON, M.D.

Ogilvie, R. F., and Mackenzie, I. Malignant Hemangio Endothelioma, with a Report of Two Cases. *J Path & Bacteriol* 1936 43 143.

The first case reported by the authors was that of an emaciated and jaundiced man twenty eight years old who was admitted to the hospital ten days after the onset of occasional vomiting and epigastric pain of a colicky nature. Physical examination disclosed a palpable mass in the epigastrium and tenderness and resistance in the region of the mass. The patient died four days after admission. Postmortem examination revealed a large quantity of fluid and clotted blood in the peritoneal cavity. The pancreas was pushed forward and upward by a moderately firm mass about the size of an orange. The mass was clearly defined from the overlying pancreas and duodenum and was traversed posteriorly by the aorta and vena cava. Microscopic examination of tissue removed from the retroperitoneal tumor showed the neoplasm to be a primarily malignant hemangio endothelioma. Secondary nodules in the liver, growths in the lung, and para aortic lymph glands presented the same histological features as the retroperitoneal growth.

The second case was that of a man fifty six years old who had suffered from pains in the side and chest, attacks of breathlessness and cough, and swelling of the abdomen for about four months prior to entering the hospital. He was emaciated and jaundiced and presented ascites and edema of the ankles. An indefinite mass was felt toward the cardiac end of the stomach. Death occurred on the twelfth day after admission. On postmortem examination 2 qt of deeply blood stained fluid were found in the peritoneal cavity. The surface of the liver was nodular as in portal cirrhosis. On section, the hepatic tissue was found to have been largely replaced by a new growth consisting of numerous closely set nodules of various sizes separated by fibrous bands or the remains of liver tissue. Numerous small hemorrhagic nodules were scattered over the visceral peritoneum, mesentery, and appendices epiploicae. The spleen contained a rounded nodule of the same type of tissue, and the lungs showed numerous small firm scattered nodules. Sections of tissue removed from the liver and the growths in the spleen, lungs, and peritoneum were examined microscopically. Numerous mitotic figures and the undifferentiated character of most of the tissue indicated extreme malignancy.

The authors discuss tumors arising from vascular endothelium as a whole and show that they represent a series of increasing malignancy.

HERBERT F. THURSTON, M.D.

Wilson, H., and Roome, N. W. Passive Vascular Exercise Observations on Its Value in the Treatment of Peripheral Vascular Diseases *J Am M Soc*, 1936, 106 1885

The authors review a series of twenty-three cases of peripheral vascular disease which were treated by passive vascular exercise.

In five of twelve cases in which a diagnosis of arteriosclerosis was made there was some subjective improvement, but little or no permanent change in the objective manifestations. In one case the patient's complaints were relieved and the appearance of the foot was definitely improved, but as in this case only eighteen and one half hours of treatment were given it is doubtful whether the passive vascular exercise was responsible for the result. In six cases there was no change.

Of eight cases of thrombo angitis obliterans, there was a slight decrease in the intermittent claudication in two and no change in six.

Of three patients with embolism, two died of the heart disease which had given rise to the embolus. The third recovered, but it is not known whether the recovery was due to the positive and negative pressure or to the papaverine treatments administered.

Many of the patients felt better during the course of the treatment, but reported no permanent beneficial results when questioned two or more months later.

The authors conclude that the passive vascular exercise did little good in this series of cases, and that it is difficult to say whether the beneficial results are to be attributed to that treatment or to the other measures employed concurrently.

HERBERT F. THURSTON, M.D.

Winslow, N., and Walker, W. W. End-to-End Vascular Anastomosis *Ann Surg*, 1936, 103 959

After briefly reviewing the history of the anastomosis of blood vessels the authors describe a method of end to end vascular anastomosis developed in the

Laboratory of Experimental Surgery at the University of Maryland. This operation is simple and does not require complicated equipment. It is an operation of the invagination type performed over a ring of pigeon bone. Upon veins it has proved successful almost without exception. The only special preparation of the raw bone is boiling for the purpose of sterilization. Without exception, the lumina of the vessels sutured by the described technique were still open after a year.

In the discussion of this report HORSLEY stated that a theoretical objection to an operation of the type described is that it sacrifices a good deal of the length of the blood vessel. Attention has been called to the importance of having the blood streams turned on fully to prevent clotting. In the old arteriovenous fistula methods of the type described cannot be used as the walls are thickened.

NEWELL reported three cases in which he performed an end to end anastomosis according to the technique of Horsley. One of the cases was that of a man whose brachial artery had been completely severed by a bullet. A perfect result was obtained. In the second case, that of a man who was slashed across the elbow by a knife with severance of the brachial artery at its bifurcation, the proximal end of the radial artery was ligated and an end to end anastomosis of the brachial to the ulnar artery was done with excellent results. In the third case, that of a boy who had been shot through the common femoral artery, an end to end anastomosis was done. When the patient was re examined ten years after the operation there was a good flow of blood through the femoral artery. Newell stated that quite frequently an end to end anastomosis is followed by occlusion at the site of the suture. If this does not occur at once, the blood vessels will have an opportunity to establish a collateral circulation and although permanent patency of the vessel may not be obtained the collateral circulation may be sufficient to preserve the extremity.

HERBERT F. THURSTON, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE, POSTOPERATIVE TREATMENT

Woltman H W Postoperative Neurological Complications *Wisconsin M J*, 1936, 35 426

Woltman does not restrict himself to postoperative complications that may be regarded as due to the anesthesia or in some manner to the operation itself, but includes also in his discussion the more common neurological and psychiatric disturbances that occur in patients who are convalescing in the hospital following an operation.

Injury to the ulnar nerve by the edge of the operating table has almost become a thing of the past. When it occurs, physiotherapy and time are sufficient to bring about recovery. In cases of severe injury, however, recovery may require about two years. An ulnar neuritis in one or both arms may also appear gradually in the course of convalescence. In some cases it is due to impingement of the nerve between the arm and the bed. In others it is noted when the patient rests his arm on the unupholstered arms of an ill fitting chair. This tardily developing neuritis is usually not so severe as the first type mentioned. The homologue in the lower limbs is neuritis of the peroneal nerve with resulting foot drop and occasional numbness of the dorsum of the foot and the anterior surface of the leg. This condition may be brought about by pressure on the mattress and by traction incidental to hyperextension of the knees on a sagging mattress. Another postoperative neurological complication is brachial neuritis. This almost always occurs in women. The Trendelenburg position and inadequately padded shoulder rests are responsible for it. Faulty posture of the patient's arms during anesthesia such as placing them under the head may by traction and pressure bring about brachial plexus palsy. Sometimes the paralysis is hysterical.

The most frequently paralyzed of the cranial nerves is the sixth nerve. Palsy of this nerve usually appears from seven to ten days after operation and is not permanent. Spinal anesthesia may be followed also by other cranial nerve palsies. Lesions of the spinal nerves, spinal cord, brain and caudal lesions of one kind or another but is not necessarily responsible for them.

Hemiplegia occurs with about equal frequency in both sexes. It may develop in children and very aged patients but the average age of its occurrence is about fifty years. The illnesses leading to the operations followed by this complication are pretty well distributed throughout the fields of general surgery, and the types of anesthesia—inhalation, infiltration, and spinal—are equally well represented. Occasionally hemiplegia may be present when the

patient awakens, but the average interval between the operation and its onset is about seven days. Woltman attempted to determine the cause of such hemiplegias. He believed it reasonable to assume that embolism of cardiac origin was responsible in at least a third of the cases. In some cases arterial spasm seemed to have been the cause. In two cases the hemiplegia was due to a disturbance of the circulation on the venous side. Of the series of patients with hemiplegia, slightly fewer than half recovered completely, a third died within thirty-five days and the remainder had more or less residual disability. The possibility that fat embolism of the cerebral vessels may cause postoperative hemiplegia is unlikely. Lhermitte and Aman Jean have reported a case of hemiplegia caused by air embolism. The question often arises whether hemiplegia following an operation performed for carcinoma is due to metastasis. This is rarely the case in hemiplegia of abrupt onset since metastatic nodules produce their symptoms less quickly. When hemiplegia occurs with empyema of the chest, it may prestage the formation of an abscess in the brain.

As a rule convulsions make their appearance within ten days following operation. They are not to be regarded as of little importance as they are generally symptomatic of an organic cerebral lesion. They may be local or general, tonic or clonic, and are often followed by paralysis. Spinal puncture is not only of diagnostic help but also of therapeutic value. When convulsions occur it is well to administer phenobarbital daily for a few months. Normally there seems to be a certain resistance to convulsions. They should be prevented whenever possible in the hope that grand or petit mal will not be added to the patient's burden.

When extrapyramidal rigidity occurs a tentative diagnosis of meningitis is usually made because the neck is found to be rigid. Continued application of pressure in raising the head will gradually permit complete flexion of the head on the thorax which is not true in meningitis. On further observation it will be found that the head may sink slowly when it is released, and possibly some resistance may be noted when it is pushed down on the pillow. The limbs also exhibit lead pipe rigidity but continued pressure during the performance of Kernig's test will make it possible to extend the legs completely. The abrupt spasm noted in meningitis on palpation of the hamstring muscles whenever a given angle is reached does not occur.

In extrapyramidal rigidity the tendon and pupillary reflexes may be absent or present, a tremor may or may not be present, the mind may be clear or confused or the patient may be comatose. In one case the globes of the eyes were deviated upward. This

condition has been observed following various types of anesthesia. It may be present when the patient is first seen following the operation or appear several days later. It is a serious sign, but in some cases recovery results. It appears to be of toxic origin in the nervous system, the disturbance is probably situated in the basal ganglia. A condition somewhat similar, but resembling more closely decerebrate rigidity, has been observed following spinal anesthesia in which the usual dose of the anesthetic is administered to a patient with profound anemia. In cases of anemia the dose of anesthetic agent given intraspinal should be sharply reduced, as Lundy has emphasized.

One of the most interesting groups of postoperative complications are the deficiencies. These are probably much more common than is generally realized and are related to the psychoses. The substratum of such complications is often present for months or years before the operation. In the treatment, it is highly important to administer adequate amounts of fluids and food. Large intramuscular doses of liver extract also hasten recovery.

Following anesthesia or operation there may be a change in the patient's behavior. Postoperative mental disorders vary in type and duration and in the patient's ability to recover from them. Most of them belong to the limited group of "postoperative psychoses." In frequency these are followed by the group which may safely be called "toxic infective exhaustive psychoses," in which the immediately preceding and following psychoses are usually included. These in turn are followed by the deficiencies which are followed by the manic depressive group, and the latter by the senile, schizoid, epileptoid, mental instability, and other groups.

Bottin, J. Postoperative Pulmonary Complications. The Influence of the Previous Condition of the Lung on the Evolution of Pulmonary Emboli (Les complications pulmonaires post opératoires. Influence de l'état pulmonaire antérieur sur l'évolution des embolies pulmonaires). *Rev de chir.*, 1936, 55 493.

The author states that when large emboli consisting of segments of vein containing lead or hipiodol are introduced into the jugular or femoral vein of animals they lodge in the lung and cause infarction which is often followed by abscess. It makes little difference whether the embolus is infected or sterile, so long as it is large. The production of infarction by this method is so different from the development of infarction in man that it is of little value. Very small emboli usually cause few or no clinical symptoms though they produce changes which can be found on roentgen and postmortem examination. As a rule dogs with such lesions remain in apparently good health. Multiple small emboli released simultaneously produce essentially the same reaction as a single large embolus.

Small single emboli injected into old dogs with presumably some disease of the lung tend to act in

the same manner as larger emboli in young healthy dogs.

If a single small embolus is injected, lodges in the lung, and produces roentgenological changes even in the absence of clinical signs, and then a second embolus is released, the effect of the second embolus in the presence of the change caused by the first one may be relatively serious.

Similarly, if the lung is traumatized by causing the animal to inhale bromine gas and a small embolus is injected while the lung is still inflamed, severe symptoms and pathological changes will usually occur and as a rule will be followed by death.

If the lung is traumatized by the bronchoscopic injection of infected material from a lung abscess, the injection of a small embolus, infected or not, will usually cause serious disturbance and death.

On the other hand, if the trauma caused by the inhalation of bromine gas or by the endobronchial injection of infected material is actively treated and allowed to heal before the injection of a single small embolus, the result of the second injection will be essentially the same as that in a healthy animal.

From this experimental evidence the author draws the following conclusions:

1. A large embolus, whether infected or not, is liable to cause serious consequences.
2. Single small emboli cause relatively little disturbance provided the lung is in a healthy condition.
3. If the lung is already diseased, even insufficiently to cause marked clinical symptoms, a single small embolus usually causes serious consequences.
4. If pre-existing disease of the lung is eradicated or alleviated by suitable therapy, the effect of a single small embolus is relatively benign and much the same as that occurring in normal animals.

MAX M. ZWINGER, M.D.

ANTISEPTIC SURGERY, TREATMENT OF WOUNDS AND INFECTIONS

Foshay, L., and Mayer, O. B. Viability of *Bacterium Tularensis* in Human Tissues. *J. Am. M. Ass.*, 1936, 106 2241.

A patient with the ulceroglandular form of tularemia, treated by antiserum, developed tularemic infection of the ulceranous harsa three months after the onset of the disease and one month after termination of the disability. No constitutional symptoms accompanied the bursitis. The regional symptoms and signs and the cellular reaction within the harsal fluid indicated a mild subacute or chronic infectious process. Viable virulent *Bacterium tularensis* was obtained from the fluid by direct cultures and by animal inoculations four months and five months after the onset of illness, corresponding to the second and third months after the termination of all disability. The *Bacterium tularensis* can survive in certain tissues of recovered patients for long periods. The ultimate outcome of the bacterial seclusions seems to depend upon the solidity of the established bacteriostatic equilibrium. Tularemic infection is a

distinct danger to the heart especially when there is pre-existing vascular disease.

About eight months after the onset of the disease in the case reported the patient had an acute heart attack. The electrocardiogram showed complete heart block with evidence of coronary disease. Five days later conduction was re-established and the ventricular rate was 90 per minute.

In a review of the literature the authors found the reports of several cases in which the patient died suddenly from an acute heart attack during convalescence from tularemia.

MANUEL E. LICHTENSTEIN, M.D.

Cole, L. The Treatment of Tetanus. *Brit. M. J.* 1936, 1: 1197.

The almost universal use of prophylactic tetanus antitoxin after deep and infected wounds has been successful in preventing tetanus. Its prophylactic value has been conclusively proved. The antitoxin should be given within twenty-four hours in all cases of wounds of any type in which anaerobic conditions may develop. Wounds considered comparatively superficial are frequently complicated by tetanus. Superficial abrasions and mild pustular lesions which scab over produce the anaerobic conditions necessary for the development of the condition. Such wounds are frequently neglected by the patient and improperly treated by the doctor. The danger of comparatively slight wounds of this type is not yet sufficiently recognized by the laity or the medical profession.

There are five types of tetanus which merge one into the other. They range from local tetanus to general tonic rigidity followed by frequent reflex spasms and death. Occasionally cephalic tetanus occurs. Meyer and Ransom state that the severity of the case depends upon the amount of toxin absorbed. They suggest a probable mechanism of the production of the symptoms. In local tetanus a very small amount of toxin slowly ascends the axis cylinder of an adjacent motor nerve, affecting the anterior horn cells of the cord and producing local muscle rigidity. Small amounts of toxin are in some way destroyed so that none is left to diffuse further into the nervous system. As larger amounts of toxin are absorbed into the general circulation more nerve elements are affected, hence the increase of symptoms to the type of frequent almost continuous convulsions. In cephalic tetanus following severe head wounds large amounts of toxin pass up the short cranial nerves, rapidly affecting the cranial nerves and basal ganglia.

The diagnosis of tetanus is based on the early symptoms of stiffness of the jaw. Frequently these are accompanied by pain in the neck, back and abdomen. As a rule fixed arching of the back, an increase in the tone of the muscles and risus sardonicus occur within the first twenty-four hours.

From the standpoint of treatment it is important to evaluate the severity of the condition as soon as possible. Its severity is usually inversely propor-

tional to the length of the incubation period. A more important factor in the prognosis is the time between the appearance of the first symptom and the occurrence of the first generalized spasms. The author terms this the 'period of onset'. On the basis of twenty-five cases he states that if, in an otherwise healthy patient, the incubation period is more than seven days, the period of onset is more than two days and both periods are more than nine days, recovery is likely to occur, whereas if the incubation period is less than seven days, the period of onset is less than two days, and the combined periods are less than nine days, recovery is unlikely.

The treatment of tetanus should be begun promptly and should include (1) the prevention of further absorption of the toxin by the central nervous system, (2) the control of reflex spasms, which kill by exhaustion or by respiratory spasm and asphyxia and (3) maintenance of strength by the administration of sufficient food and fluid and measures to promote sleep.

Experimental evidence presented by Wood, Florey, and Fildes has shown that the intrathecal and external routes for administration of antitoxin possess no advantage over the intravenous route. In fact, intrathecal injection of serum has the disadvantage of producing, in some cases, a serous meningitis which may give rise to an exacerbation of the symptoms. Repeated daily doses of serum are not indicated. The work of Spooner has shown that seven days after the injection of 200,000 units of tetanus antitoxin, more than 10 units of antitoxin per cubic centimeter, that is a total of 50,000 units, and at the end of fourteen days between 3 and 5 units per centimeter still remain in the circulating blood. Therefore it seems doubtful if any advantage is gained from a further injection of antitoxin before the tenth day. This conclusion was proved reasonable in the author's last fifteen cases which were treated by one large intravenous dose of antitoxin (usually 200,000 units) given as soon as possible. The antitoxin prevents further absorption of the toxin from the blood, but there is no evidence that it neutralizes toxin already absorbed by the nerve cells.

Treatment of the wound should be postponed until one hour after the injection of a large dose of antitoxin. Thorough local treatment of the wound is then very important. It should consist chiefly of mechanical cleansing, the removal of devitalized tissue and foreign material and adequate drainage.

Control of reflex spasms is another essential. These spasms interfere with the patient's rest, feeding and respiration. In the author's cases avertin is given by rectal instillation in doses of from 0.07 to 0.1 c.c.m. per kilogram of body weight. This usually stops the reflex spasms and relaxes the jaw for a period of from four to six hours. As soon as spasms begin to return another dose is given, the amount depending upon the effect of the amount of the preceding dose. Respiratory depression should be treated by appropriate measures such as the use

of carbogen and atropine. When the spasms become less infrequent, paraldehyde may be given rectally in normal saline solution (1 drachm to $1\frac{1}{2}$ oz. of saline solution) in doses up to 6 drachms. It may be alternated with avertin, but is not so good as avertin alone.

Because of the risk of respiratory paralysis the use of curare and its derivatives seems inadvisable, especially since avertin can do all that is hoped for from curare, with very much less danger.

The patient's strength must be maintained with an intake of at least 2,000 calories daily. After the spasms are controlled a Levine tube may be passed for feeding. Stomach tubes should be removed daily and properly cleansed. It is essential to have experienced nurses. The patient should be placed on an inflated mattress, the bed clothes cradled, and the room darkened.

In conclusion the author expresses the opinion that the described regimen will prevent death in cases in which a lethal dose of tetanus toxin has not become fixed in the nerve tissue.

JOHN E. KIRKPATRICK, M.D.

ANESTHESIA

Haller. General Anesthesia Induced With Sodium Evipan (Anesthésie générale à l'évipan sodique). *Bull. et Mém. Soc. de chirurgiens de Par.*, 1936, 23, 247.

Haller notes that while various barbiturates have been used for basal anesthesia in association with general anesthetics, sodium evipan is the only one which is employed as a general anesthetic for the entire operation without any supplementary anesthesia. This is due to two advantages of sodium evipan—the wide margin between the anesthetic and the toxic dose, and the lack of a cumulative effect.

Haller employs a freshly made 10 per cent solution of sodium evipan in distilled water (1 gm. of evipan to each 10 c cm.) This is injected intravenously into the arm, the dose varying according to the condition of the patient and the nature of the operation. The injection is given at the rate of 1 c cm. a minute until the patient is asleep. It then may be given at the rate of 1 c cm. per one half minute until the necessary degree of surgical anesthesia is obtained, as shown by dropping of the jaw and disappearance of the corneal reflex. The patient experiences no discomfort during the administration of the anesthetic. When surgical anesthesia has been obtained the operation is begun and glucose solution is given intravenously drop by drop. If the operation is prolonged or the anesthesia is not maintained satisfactorily, from $\frac{1}{2}$ to 1 c cm. of the evipan solution can be given simultaneously.

During anesthesia induced with sodium evipan the patient is usually pale because of the drop in the blood pressure which as a rule results from the administration of evipan. In abdominal operations rigidity of the abdominal wall has been noted. As patients are apt to show considerable restlessness and excitability on coming out of evipan anesthesia,

an injection of morphin is given at the close of the operation.

In the forty six cases reviewed from 1 to 13 c cm. of the evipan solution were necessary to obtain physiological sleep, from $1\frac{1}{2}$ to 13 c cm. to obtain surgical anesthesia, and from 0.50 to 17 c cm. to maintain the necessary degree of anesthesia. The total dose used from the beginning to the end of the operation varied from 2 to 26 c cm. of the solution, which was equal to from 0.20 to 2.60 gm. of the sodium evipan. Supplementary anesthesia was necessary in only one case. In two cases the results were not entirely satisfactory, but the operation was completed without other anesthesia. In forty three cases the anesthesia was "perfect."

The patients ranged in age from ten to sixty nine years. Thirty six of them were females. Fourteen gynecological operations were performed. Most of the operations were laparotomies.

ALICE M. MEYERS

Schuberth, O. O. On the Disturbance of the Circulation in Spinal Anesthesia. An Experimental Study. *Acta chirurg. Scand.*, 1936, 78, Supp. 43.

When starting the work reported the author planned to study the changes in the circulation expressed by the fall in blood pressure in spinal anesthesia by examinations of human subjects. Because of difficulties encountered in methods the greater part of the work was later carried out by experimental investigations on animals.

Schuberth presents a brief review of the recent literature on shock. He defines the condition as peripheral circulatory insufficiency. The question is raised, Does the great fall in the blood pressure during experimental anesthesia indicate that a condition of shock is present? Before answering this question he states that it is necessary to determine how the circulation is affected. To do this the cardiac output, venous pressure, and circulating blood volume during experimental anesthesia must be studied. To complete these studies is the author's first aim.

The author presents a review of the various theories regarding the cause of the fall in blood pressure during spinal anesthesia. The two theories between which a choice must be made are, (1) Paresis of the vasoconstrictors, possibly with special emphasis on the splanchnic changes, (2) Primary respiratory disturbance with secondary circulatory derangement. The second purpose of the author's researches is to assist in making clearer the causes of the fall in the blood pressure in spinal anesthesia.

In experiments on rabbits it was found that spinal anesthesia caused a moderate decrease in the oxygen consumption. A slight decrease occurred in the oxygen content of the arterial blood, a considerable decrease in the oxygen content of the venous blood, a considerable increase in the arterial venous oxygen difference, and a considerable decrease in the cardiac output per minute.

Determinations in man disclosed no definite changes in the oxygen consumption though a slight decrease is probable. The arterial venous difference was increased. In four cases the cardiac output showed a decrease combined with a marked fall in the blood pressure.

In rabbits, the pressure in the right auricle showed no change or a slight decrease when the anesthesia was not combined with respiratory failure. Accordingly there is reason to consider the circulatory disturbance in spinal anesthesia as shock. In rabbits and cats the circulating blood volume i.e., plasma plus red cell volume showed no change. The absence of a decrease in the blood volume in a fundamental manner differentiates the shock of spinal anesthesia from most other kinds of shock.

In rabbits the red cell hematocrite value showed a decrease. The author attributes this to a displacement of the corpuscular elements of the blood toward the capillaries. No sure increase in the capillary content of blood corpuscles was noted.

In rabbits under spinal anesthesia affecting the greater part of the thoracic cord recording of the tidal air disclosed no change because of the paresis of the intercostal muscles. There is no support for the opinion that the fall in the blood pressure is secondary to this paresis. Neither does the tidal air in spinal anesthesia in man show any change that can explain the considerable fall in the blood pressure that may occur. Experiments on rabbits showed that, even in spinal anesthesia including the whole thoracic cord the respiration is sufficient for saturation of the blood passing through the lungs. The

decrease in the oxygen content of the arterial blood is explained by the simultaneously falling hematocrite values.

From the results of his studies the author concludes that in the treatment of the fall in the blood pressure associated with spinal anesthesia heart stimulants are evidently not indicated. Injections of cardiazol or coramin have very little effect as they act over the vasomotor center which, because of the paresis of the vasoconstrictors to large parts of the body, has no opportunity of asserting its full influence. Strychnine has little effect for the same reason. Adrenalin and ephedrine, which attack the peripheral vessels directly, are of very great importance.

Physiological Ringer solution given by vein is also indicated. All the fluid injected remains in the blood stream and therefore assists in increasing the cardiac output and stabilizing the blood pressure. The author has found that such an intravenous injection of liquid has a strikingly rapid and lasting effect on a falling blood pressure in spinal anesthesia. He therefore believes it should be used to a greater extent than it is at present.

Trendelenburg's position, creating favorable conditions for venous return from the lower parts of the body assists in increasing the cardiac output. Carbon dioxide causes a rise in the blood pressure by influencing the arterioles and should be used by combining a 5 per cent mixture with oxygen. Pure oxygen produces no effect as the oxygen of the air alone is sufficient for satisfactory saturation of the arterial blood.

HERBERT F. THURSTON, M.D.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Broveilli, M., and Dolfini, G. E. Lymphography
(La linfografia) *Radiol med*, 1936, 23, 293

The authors present a comprehensive review of the literature and report their experiments on roentgenography of the lymphatic system with colloidal thorium dioxide in certain lower vertebrates and mammals. In the latter, the subcutaneous, intra venous, intraglandular, and intraparenchymal (hepatic, testicular) routes were used. An important part of the experiments was a comparison of the roentgenographic and histological findings.

In frogs, snakes, and fish, colloidal thorium dioxide injected subcutaneously in massive doses was rapidly absorbed by the lymphatic system whence it passed into the blood and was finally fixed by the endothelium of the spleen and liver. The entire lymphatic system was rendered visible. The animals died after two or three days with an intense edema.

In guinea pigs, rabbits, and dogs, small doses were used to make visible limited areas of the lymphatic system, the purpose being to work toward a method applicable to man. The results partially confirm and also extend the findings of other investigators. By injection into the tongue, nasal mucosa, and subcutaneous tissue of the limbs, the lymphatics and nodes of the respective regions were roentgenographed (Fig. 1). Injection into the popliteal gland brought out the vessels up to, and including, the thoracic duct. When the metal was introduced into the parenchyma of certain organs, it was absorbed through the lymphatics. After intrahepatic injection, the retrosternal channels were visible. By injection into the testicle, an especially fine demonstration of the intraglandular network and efferent vessels was obtained (Fig. 2).

The passage of thorium through the lymphatic system is effected by both mechanical and biological factors. Visibility immediately after the injection is due to mechanical causes. To obtain clear pictures, sufficient pressure at the site of the injection is essential. If the pressure is too low to inject the lymph nodes, demonstration of the lymphatic vessels is very difficult. Success depends also on gauging the brief period of optimum visibility. Many failures are due to too long delay in the making of the roentgenograms. Within the first hour, the lymphatics are filled with thorium, partly free and partly phagocytosed. The glands produce a delicate uniform shadow surrounded by a network of efferent vessels as the lymph loaded with thorium distends the sinuses. Later, as the *vis-a-tergo* diminishes and phagocytosis increases, collections of thorium cells in the sinuses slow down the efferent current. The



Fig. 1. Dog. Five minutes after injection of colloidal thorium dioxide into the subcutaneous tissue of the foot.

glands then present a characteristic spongy appearance as the follicles are only slightly impregnated (Fig. 3). After a few months the lymphoid tissue practically disappears, the reticular system is hypertrophied, and the thorium is taken up completely by phagocytes gathered in sharply defined cords (Fig. 4) thus giving the glands a stippled appearance. The vessels, especially the efferent channels, are often occluded by a syncytium of thorium cells or thrombi of coagulated lymph and masses of thorium (late permanent visibility, "rosary" appearance). The perviousness of the glands is increasingly reduced without being abolished, and the process is repeated in each successive gland of the chain.

When the channels are blocked, when the absorbent capacity of the glands is exceeded, or when the injection is made into a tissue poor in lymphatics, the mechanism of transportation is different. The



Fig 2 Dog Intratesticular injection

phagocytes then migrate along the sheaths of the lymphatic and blood vessels the aponeuroses the perimysium and the loose connective tissue. Therefore, a roentgenogram of the fascicular structure of aponeuroses and muscles may sometimes be obtained.

The authors conclude from their experiments that the methods used do not permit exact measurement of the normal velocity of the lymph current as the



Fig 3 I optileal gland of a dog one hour after injection showing the characteristic spongy appearance which continues for many months

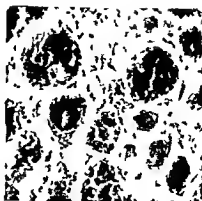


Fig 4 Lymph gland one year after injection showing cords of thorium phagocytes joined into syncytia and surrounded by capsules of proliferating cells of the epithelioid type. The lymphoid tissue has disappeared and there is no free thorium

experimental factors are too variable. However, a reliable picture of the perviousness of the lymph channels is usually obtained. From the study of the roentgenographic appearance of the lymph nodes practical results may be expected since the findings prove that this corresponds in minute detail to the histological disposition of the metal. The roentgenograms give an orientation as to the perviousness of the sinuses and the phagocytic capacity of different parts of the gland, and it may be assumed that unusual appearances are related to structural changes.

The article is accompanied by roentgenograms, photomicrographs and an extensive bibliography.
M E MORSE MD

Capocaccia M and Vallebona A. Roentgen Therapy Short Wave Treatment and Thorium Preparations (Roentgentherapie, marconiterapia e preparati di torio). *Radiol med*, 1936 23 389

For the last few years Capocaccia and Vallebona have studied the possibility of using substances which are capable of sensitizing certain cells or cell groups to the action of x rays. They found that colloidal thorium oxide causes such sensitization. In extending their studies to short waves they attempted to modify the distribution of the colloidal thorium oxide so as to increase its fixation in certain cells or cell groups or cause the fixation of large quantities in organs which normally are capable of fixing only small quantities.

In summarizing their results they state that after fixation has occurred there is no mobilization of thorium preparations even following intense short wave treatment. Strong doses of short waves administered during the impregnation retard fixation of the thorium whereas small doses of short waves facilitate its fixation in the liver and spleen.

Histological examination shows that impregnation with colloidal thorium oxide makes the organs

more susceptible to the harmful action of short waves. The observations made with thorium and x rays are identical with those made with thorium and short waves. In organs which have the ability to fix greater quantities, such as the liver, spleen, and lung, thorium injected in quantities equivalent to those used for hepatosplenography in clinical cases causes congestive changes and cellular degeneration which ranges from simple cloudy swelling to fatty degeneration. These changes involve also the kidney, which appears to be in a state of nephrosis. Under the influence of short waves, thorium acquires a necrotizing action on tissues. Short waves alone, used in the same doses and under the same conditions, do not have this effect on normal tissue.

The authors conclude that short waves applied to a tissue produce a stimulation strong enough to cause increased local fixation of intravenously injected thorium. This finding opens new pathways of research.

While it has been definitely established that short waves increase the injurious effects of thorium on the tissues, colloidal thorium injected in the quantities used for hepatosplenography exerts an injurious action on the parenchyma of organs which are capable of fixing greater quantities, such as the reticuloendothelial system. Therefore hepatosplenography should be carried out with caution and only in exceptional cases.

From the therapeutic point of view, the combination of x rays and thorium may have a considerable practical value and should be studied further.

RICHARD E. SOMMA, M.D.

MISCELLANEOUS

Ruppanner, E. Climatic and Solar Therapy in Surgical Tuberculosis (Zur Frage der Klima- und Sonnenbehandlung bei chirurgischer Tuberkulose). *Wien klin Wchnschr*, 1936, 1: 229.

On the basis of his experience in the treatment of surgical tuberculosis in Oberengadin over a period of twenty five years, the author discusses several important factors in the climatic treatment of the condition. He states that while sunlight is a potent curative agent, a change of climate is also of great importance, as was recognized by Hippocrates.

Campbell of Pontresina found that when inhabitants of mountainous regions were treated in the lowlands excellent results were obtained. Ruppanner has found that solar and climatic treatment have a curative effect only when the body is exposed to increased sunlight in a different climate. He warns that sun treatment must not be overestimated although it has given lasting cures especially in tuberculous spondylitis, sacrocoxygeal inflammation, tuberculosis of the wrist, multiple foci of tuberculosis in soft tissues, and tuberculous peritonitis. As its results are particularly good in young patients, non surgical treatment should be continued as long as possible in the cases of children. However it is difficult to answer the question whether the frequently brilliant results of heliotherapy are permanent results or merely pseudo cures. Positive cure of surgical tuberculosis by purely conservative treatment is likewise difficult to prove. Often in the cases of patients who felt and looked well and who died of some acute disease, autopsy has revealed active foci in the bones and joints.

The importance of thorough tanning of the skin, which many physicians regard as a good indication of cure, must not be overestimated.

There are patients who cannot be cured despite years of treatment in high mountainous altitudes. Therefore operative treatment of tuberculosis of bones and joints has again come into general favor. The duration of the non surgical treatment is an important consideration in this disease as adults especially are often unable to bear so much loss of time and prolonged treatment often breaks down their morale. Therefore climatic and solar treatment must be kept within certain time limits.

In tuberculous spondylitis and coxitis and tuberculous inflammation of the wrist, operative procedures are inadvisable even in the cases of adults. The knee joint, however, is a favorable site for operation, as are frequently also the elbow, shoulder, and ankle.

In the cases of patients receiving proper general treatment for some time before operation, resection is followed by particularly good and rapid healing.

Patients operated upon for surgical tuberculosis should be given postoperative climatic therapy.

(SALZER) MATTHIAS J. SEIFERT, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Traana Rao G *Researches and Considerations Regarding the Lipoid Exchange of the Non-Pregnant Woman and on Certain Physiological and Pathological Obesities (Ricerche e considerazioni sul ricambio lipidico della donna non gestante e su talune adiposità fisiologiche e patologiche)* *Riv Ital di ginec* 1936 19 2

The author studied the blood of non pregnant women with respect to total fat neutral fats, phosphatides soaps and cholesterol. On the basis of the findings of this investigation and studies of a number of obese women whose cases he reports in detail he discusses the characteristics of the various types of obesity. He states that obesity of the hypothyroid type occurs chiefly in the upper portions of the body (upper thorax neck back and face) and often progresses to small roll formations. Hypophyseal obesity affects chiefly the breasts abdominal venous and nates. Obesity of genital origin is localized in the pelvirochantic regions and may lead to pedunculated or apron formations.

He believes that the lipomas should be classified with the obesities. The numerous types of lipomas which have been designated by various terms according to the morphological character of the adipose mass and the collateral clinical symptoms have so many characteristics in common that they may all be classified together. The theory of a single causative factor is supported also by the evident relationship of the various types to a hereditary factor the constitution the vegetative endocrine system and the sex glands. The causative factor is probably a disturbance of the fat equilibrium at some stage in the process of lipid exchange. The author reviews the stages of lipid exchange to show the possibilities of such disturbances. **A LOUIS ROSE MD**

Peters R A *The Biochemical Lesion in Vitamin B Deficiency* *Lancet* 1936 230 1161

Pigeons fed on diets deficient in Vitamin B₁ develop two fairly well marked and different states. The first or chronic state is characterized by varying degrees of wing and leg weakness and spasticity, which respond slowly to diets rich in Vitamin B₁. Although polyneuritis is considered to be the cause of the manifestations proof of the existence of such a pathological lesion is still lacking. The second or acute state is characterized by impairment of vision opisthotonus and cartwheel convulsions. Exercise noise, and strong light exaggerate the latter two symptoms. In the terminal stage failure of temperature regulation occurs. All of these symptoms usually disappear rapidly after the injection of

Vitamin B₁. The author's conviction that a clue to the nature of the acute manifestations would be found in the brain led to a series of biochemical researches upon the latter.

Brain tissue from pigeons which was removed within ten seconds after death and immediately plunged into liquid air showed an increase in the lactic acid content of the lower parts of the brain and the optic lobes, but not in that of the cerebellum. Because of this uneven distribution attention was directed toward local factors. The oxygen uptake of tissue from various parts of the brain was therefore studied in the Barcroft microrespirometer to determine whether in avitaminous birds, there were variations from the normal in tissue respiration. None was found unless glucose or lactate solution was added as a substrate, when the respirations were lowered and there were lactic acid accumulations especially in the lower parts of the brain. As avitaminous birds treated with Vitamin B₁ failed to show these changes the latter were considered specific of vitamin deficiency. When Vitamin B₁ was added to avitaminous brain *in vitro* the normal oxygen uptake was restored. As this occurred after the addition of very small quantities the action was evidently catalytic. On normal brain the vitamin had practically no effect. These facts seem to warrant the conclusion that Vitamin B₁ is needed for the oxidative removal of lactic acid.

Further experiments by the author established the specificity of Vitamin B₁ deficiency in affecting sugar metabolism at some point related to the 3 carbon stage and thus affecting the removal of lactic acid. The work of Meiklejohn demonstrated however, that when Vitamin B₁ is added to avitaminous brain the removal of lactic acid is not directly increased although the oxygen uptake is increased. This suggested that the effect is exerted primarily upon an intermediate product. The latter was found to be pyruvic acid. When the blood of avitaminous animals is examined pyruvic acid in relatively large amounts is found. It disappears when treatment with Vitamin B₁ is begun.

As the acute symptoms of avitaminosis cannot be produced by injections of lactate and the amounts of pyruvate found in the blood are small, there is no support for the toxic theory of avitaminosis. Therefore only the theory of pure deficiency remains. On the basis of this theory, the absence of an important factor in the development of energy from carbohydrates would be sufficient to stop the normal functioning of some group of nerve cells. Those cells which normally have the most work to do might be expected to run out of their supply of the catalyst Vitamin B₁ sooner than others. In other words if the normal metabolism of glucose at any

stage is interrupted, the brain cells do not function properly. By analogy, other factors which interfere with some stage of sugar metabolism will have the same effect. Among these may be mentioned asphyxia, insulin overdosage, cyanide poisoning, and anesthetics such as chloroform.

The prolonged nature of the chronic symptoms suggests the existence of more extensive cell change. Pickett has described disseminated foci of hemorrhage, or intense congestion of one or both sides involving Deiter's nucleus, the chief vestibular nucleus of Bechterew, and the nucleus solitarius. In spastic beri beri in pigeons, the author observed disseminated hemorrhage in the pons, medulla, or cerebellum, and to a lesser extent in the optic lobes and cerebral hemispheres.

The relationship of the experimental production of avitaminosis in animals and the occurrence of beri beri in man is demonstrated to some degree by the detection of pyruvate in the blood of patients in China where the disease is relatively common.

ARTHUR S. W. TOUROFF, M.D.

Warren, S., and Gates, O. The Fate of Intravenously Injected Tumor Cells. *Am J Cancer*, 1936, 27, 485.

The authors compare the results of intravenous injections of artificial and natural suspensions of the cells of the Walker carcinoma 256 in the Shumaker strain of white rat.

The uninjured cells in natural suspension produce earlier and more numerous pulmonary nodules. The mechanism of metastasis is the same with both inocula. Blood has no toxic effect on tumor cells.

Involvement of extravascular tissue occurs rarely by direct penetration of the arteriolar wall, but usually by growth through the less resistant capillary walls. Hyaline thrombi appear early and disappear early without organization. There is no reaction of the endothelium to tumor tissue.

The most important factor in the occurrence of metastasis is the growth potentiality of the individual cells.

SAMUEL KAHN, M.D.

Bittner, J. J. The Spontaneous Incidence of Lung Tumors in Relation to the Incidence of Mammary Tumors in an Inbred Strain of Albino Mice (Strain A). Preliminary Report. *Am J Cancer*, 1936, 27, 519.

Females of the inbred A strain of mice inherit the susceptibility to breast tumor and lung tumor for mation. Parity results primarily in mammary tumors. The incidence of pulmonary tumors in males is approximately the same as in virgin females and compares with the incidence of mammary tumors in breeding females.

SAMUEL KAHN, M.D.

Hauser, I. J., and Weller, C. V. A Further Report on the Cancer Family of Warthja. *Am J Cancer*, 1936, 27, 434.

Warthja reported observations regarding the cancer family under consideration on 2 occasions,

in 1913 and again in 1925. Of the 48 descendants of a cancerous grandfather who were traced at the time of the first report, 15 had developed cancer, and 2 had developed benign neoplasms. Of 146 descendants traced in 1925, only eighty eight had reached adult life and 28 had developed neoplasms.

At the present time the family includes 305 individuals of whom 174 have attained the age of twenty five years. This age was selected as the beginning of the cancer age for the family since carcinoma has occurred in individuals as young as twenty five years. Of the 174 members of the family who had attained the age of twenty five years, 41 (23.6 per cent) have developed malignant neoplasms. The gastro intestinal tract and the uterus are the primary sites of so many of the tumors that primary involvement of other parts of the body appears to be accidental. Microscopic examination showed that all of the carcinomas of the uterus were adenocarcinomas of the endometrium.

Each of the branches of the family is considered separately and in some detail. In 2 branches cancer has never appeared. The authors find the anatomical location of the primary lesion more important than the total incidence of malignancy. They regard the predominance of lesions of the gastro intestinal tract as noteworthy. They are of the opinion that this family provides very strong evidence of an inheritable organ specific predisposition to carcinoma.

HAROLD C. OCHSNER, M.D.

Heyd, C. G. The Surgical Problems of the Obese and the Lean Patient. *Surg Clin North Am*, 1936, 16, 713.

The author states that there are certain differences to be observed in the technical application of surgical procedures to the obese and the lean patient. The obese female often presents the concomitant findings of fibromyomas, cholelithiasis, and colloid goiter. In the obese male, duodenal ulcer and pancreatitis are frequently associated conditions. The lean male patient often presents a gastric ulcer and visceroptosis, and the lean female visceroptosis and varying degrees of liver disease.

Both the obese and the lean patient require a more detailed pre operative study than the patient of average weight. In the obese patient, cardiovascular disturbances, the association of diabetes, biliary disease, and gout, and decreased resistance to infection are possibilities and the liver is often smaller than normal. The mere presence of obesity renders an accurate prognosis difficult.

The anesthetic should be selected with great care and only after consideration of all factors. Anesthetics that are introduced by vein or by rectum are inadvisable because of the possibility of added insult to the liver. The dose of an anesthetic should be less than the dose calculated on the basis of the patient's weight. In the cases of very obese patients inhalation anesthesia is usually contra indicated. The anesthesia of choice is intradural block of the spinal nerves.

Among the factors with an unfavorable influence on the results of surgery on the obese are (1) the greater length of the incision necessary, (2) the depth of the abdominal wall, (3) limitation of the exposure (4) greater friability of the mesentery and peritoneal structures, (5) a greater tendency toward postoperative transudation of serum, (6) poor muscular closure (7) greater frequency of wound dehiscence and (8) the probability of a persistent serous discharge from broken down and traumatized fat.

Among lean patients there is one class which exhibit a low vasomotor tone and are apt to develop surgical shock following relatively minor procedures. In the cases of such patients the diagnostic problem is more difficult, more extended tests of body function are often necessary, and the chance for complete cure is less favorable. In contrast to that of the obese patient, the pre-operative treatment is satisfactory if the blood pressure is raised and an adequate intake of fluid and dextrose is provided.

Of chief importance in the pre operative preparation of all patients is determination of the water requirements. It has been roughly calculated that for each degree of elevation of the temperature above the normal and for any increase of 30 heart beats over 80 there is an additional body loss of 500 c. cm. of water per day. It must be borne in mind that, because of their greater body surface obese patients lose greater amounts of water by irradiation than lean patients. A great loss of body fluids as by vomiting may establish a vicious circle with either dehydration or hypochloremia. Alteration of the enterohepatic water circulation may cause either acidosis or alkalosis.

In the author's cases the pre-operative and post operative regimes are based on the maintenance of a full water balance by the administration of at least 3,000 c. cm. of fluid daily and increasing the glycogen reservoir function of the liver. For forty eight hours before operation the diet consists chiefly of carbohydrates. In the cases of jaundiced patients the

bleeding and coagulation time are determined, and if they are found delayed, calcium chloride is given intravenously once daily. Transfusions given before operation have been found of greater value than transfusions given after operation.

After all laparotomies there is an absorption of normal and altered blood serum, pathological exudates, and the by products of a deranged gastrointestinal system. As the absorption of a great amount of wound serum increases the burden on the liver, abraded or denuded surfaces left by the operation should be minimal and as much fluid as possible should be aspirated from the operative field.

If postoperative vomiting occurs, the use of an indwelling Levine tube, absolute deflation of the stomach and the parenteral administration of fluids are indicated. During the time the Levine tube is in place the patient may drink water and allay the sensations of thirst without endangering the tranquility of the stomach. HARVEY S. ALLEN, M.D.

SURGICAL PATHOLOGY AND DIAGNOSIS

Lamarque P. *Historoentgenography A New Technique for the Examination of Microscopic Sections* (L'historadiographie Nouvelle technique d'examen des coupes microscopiques) *Presse med. Par.* 1936 44 478.

Using mammalian tissue, the author has carried out investigations similar to those of Dauvillier in 1930 on the roentgenography of histological sections of plant tissues.

To obtain satisfactory results a special tube which utilizes a tension of about 5 kv. is required. The fixed but unstained sections are placed directly on the surface of a special fine grained emulsion.

It is hoped by this method to advance the study of the minute structure and elements of tissues and cells. To date however, no definite conclusions have been drawn.

The article contains eleven historoentgenograms. ALBERT F. DE GROOT, M.D.

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